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**ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE  
(STS-30) LAUNCH**

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## TECHNICAL MEMORANDUM

# ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-30) LAUNCH

## I. INTRODUCTION

This report presents an evaluation of the atmospheric environmental data taken during the launch of the Space Shuttle/STS-30 vehicle. This Space Shuttle vehicle was launched from Pad 39B at Kennedy Space Center (KSC), Florida, on a reference bearing of 88-degrees east of north, at 1847 u.t. (1447 e.d.t.) on May 4, 1989.

This report presents a summary of the atmospheric environment at launch time (L+0) of the STS-30, together with the sequence of prelaunch Jimsphere-measured winds aloft profiles from L-5.2 hr through liftoff. The general atmospheric situation for the launch and flight area is described, and surface and upper level wind/thermodynamic observations near launch time are given. Since the ship Redstone was unavailable for STS-30 duty, the SRB descent/impact atmospheric data were not taken. However, one can use the STS-30 ascent data for SRB studies as the best substitute.

Previous MSFC-related launch vehicle atmospheric environmental conditions have been published as Appendix A of individual MSFC Saturn Flight Evaluation Working Group reports [1]. Office memorandums have been issued for previous flights giving launch pad wind information. A report has also been published [2] which summarizes most launch atmospheric conditions observed for the past 155 MSFC/ABMA-related vehicle launches through SA-208 (Skylab 4). Reports summarizing ASTP, STS-1 through STS-29 launch conditions are presented in References 3 through 24, respectively. Table 1 gives the atmospheric L+0 launch conditions for all the Space Shuttle missions.

## II. SOURCES OF DATA

Atmospheric observational data used in this report were taken from synoptic maps made by the National Weather Service, plus all available surface observations and measurements from around the launch area. Upper air observations were taken from balloon-released instruments sent aloft from Cape Canaveral Air Force Station (CCAFS). High-altitude winds and thermodynamic data were generated by the global reference atmospheric model (GRAM) since there was no reliable Super-Loki rocketsonde data. Table 2 presents a listing of systems used to obtain the upper level wind profiles used in compiling the final ascent atmospheric data tape. Data cutoff altitudes are also given in Table 2.

### **III. GENERAL SYNOPTIC SITUATION AT LAUNCH TIME**

A ridge of high pressure with its center over North Carolina dominated the weather pattern over KSC during the launch of STS-30. Surface winds were generally from the east and wind speeds were moderate. Figure 1 presents the surface map 6 hr 47 min before launch of STS-30. Southwesterly winds controlled the flow aloft over the KSC area. Figure 2 shows the winds aloft condition at 500-mb level 6 hr 47 min before launch.

Clouds were scattered to broken over eastern Florida prior to the launch of STS-30. Figure 3 depicts the GOES-7 visible picture at 1846 u.t. (1 min prior to liftoff) with the 500-mb heights and wind barbs superimposed. Figure 4 presents an up-close visible shot of the Florida peninsula as recorded by GOES-7 taken also at 1846 u.t.

There was approximately an hour delay of STS-30 launch due to cloud cover over the KSC shuttle runway site.

### **IV. SURFACE OBSERVATIONS AT LAUNCH TIME**

Surface observations at launch time for selected KSC locations are given in Table 3. Included are pad 39B, Shuttle runway, and CCAFS balloon release station observations. Neither precipitation nor lightning was observed at launch time.

Table 4 presents pad 39B wind data along with other standard hourly atmospheric measurements and sky observations for the 6-hr period prior to launch of STS-30. Values for wind speed and direction are given for the 18-m (60-ft) pad light pole level.

### **V. UPPER AIR MEASUREMENTS DURING LAUNCH**

The FPS-16 Jimsphere (1902 u.t.) and the MSS Rawinsonde (1820 u.t.) systems were used to measure the upper level wind and thermodynamic parameters for STS-30 launch. At altitudes above the measured data, the GRAM [25] parameters for May KSC conditions were used. A tabulation of the STS-30 final atmospheric data for ascent is presented in Table 5 which lists the winds and thermodynamic parameters versus altitude. A brief summary of parameters is given in the following paragraphs.

#### **A. Wind Speed**

At launch time, wind speeds were 21.6 ft/s (12.8 kn) at 60 ft and increased to a maximum of 157 ft/s (93 kn) at 44,200 ft (13,472 m). The winds decreased above this level throughout 94,000 ft (28,651 m) which was the altitude of the last measurable wind speed. The left side of Figure 5 shows a plot of the wind speed versus the altitude.

## **B. Wind Direction**

At launch time, the 60-ft wind direction was from the east (106 deg) shifting to southerly at 6,000 ft (1,829 m). Above this altitude, to 11,200 ft (3,414 m), winds were light and variable. Winds took on a westerly component above this level through 64,000 ft (19,507 m) where they became southerly. Winds were variable throughout the last measurable direction which was 94,000 ft (28,651 m). Figure 5 depicts the complete wind versus altitude profile specifying wind direction on the right side.

## **C. Prelaunch/Launch Wind Profiles**

Prelaunch/launch wind profiles given in Figures 6 through 9 were measured by the Jimsphere FPS-16 system. Data are shown for four measurement periods beginning at L-5.23 hr and extending through L + 15 min.

The wind speed and direction profiles for the 5.23-hr period prior to and including L + 15 min are shown in Figures 6 and 7. The in-plane (head-tail wind) and out-of-plane (left-right crosswind) profiles are given in Figures 8 and 9. The wind speeds and in-plane component speeds were less than the May 95-percentile wind values at mostly all altitude levels. The out-of-plane component speeds were mostly less than or equal to the mean May wind values.

## **D. Thermodynamic Data**

The thermodynamic data, taken at STS-30 launch time, consisted of atmospheric temperature, dew-point temperature, pressure, and density. These data have been compiled as the STS-30 ascent atmospheric data and are presented in Table 5. The vertical structure of temperature and dew-point temperature for STS-30 ascent are shown graphically versus altitude in Figure 10.

## **E. SRB Upper Air and Surface Measurements**

As has been mentioned in the introduction, since there was no ship available, an SRB descent atmospheric data tape has not been constructed. The tabular values for the ascent atmospheric tape, as presented in Table 5, should be used for SRB descent/impact studies since it is the closest measured data source.



TABLE 1. SELECTED ATMOSPHERIC OBSERVATIONS FOR THE FLIGHTS OF THE  
SPACE SHUTTLE VEHICLES

Vehicle Data				Surface Observations				Inflight Conditions Max. Wind Below 60,000 ft			Count Down and Launch Comments of Meteorological Significance
Seq. No.	Vehicle No.	Launch Date	Time (EST) Nearest Minute	Thermodynamic <sup>a</sup>		Wind <sup>b</sup>		Alt. (ft)	Speed (ft/sec)	Dir. (deg)	
				Press. <sup>c</sup> N/cm <sup>2</sup>	Temp. (°C)	Rel. Hum. (%)	Speed (ft/sec)	Dir. (deg)			
1	STS-1 Columbia	4/12/81	0700	10.234 <sup>d</sup>	21	82	11.8 15.2	125 120	44,300	98	250
2	STS-2 Columbia	11/12/81	1010	10.166	23	61	27.0 27.0	345 355	36,300	158	286
3	STS-3 Columbia	3/22/82	1100	10.160	24	71	7.0 <sup>e</sup> 8.0 <sup>e</sup>	50 <sup>e</sup> 145 <sup>e</sup>	45,000	119	250
4	STS-4 Columbia	6/27/82	1100 <sup>f</sup>	10.200	29	70	5.8 <sup>g</sup> 4.9 <sup>g</sup>	133 <sup>g</sup> 141 <sup>g</sup>	47,900	37	329
5	STS-5 Columbia	11/11/82	0719	10.227	22	68	22.0 35.0	90 90	40,600	146	336
6	STS-6 Challenger	4/4/83	1330	10.183	23	55	12.7 16.4	63 55	46,100	155	277
7	STS-7 Challenger	6/18/83	0733 <sup>f</sup>	10.146	25	80	5.9 <sup>e</sup> 10.3 <sup>e</sup>	10 <sup>e</sup> 350 <sup>e</sup>	45,900	76	278
8	STS-8 Challenger	8/30/83	0232 <sup>f</sup>	10.111	24	97	8.8 14.0	269 268	45,100	30	349
9	STS-9 (SL-1) Columbia	11/28/83	1100	10.153	24	83	19.1 32.0	183 190	47,100	117	252
10	STS-11 (41-B) Challenger	2/3/84	0800	10.173	17	75	0.0 NA	0 NA	38,200	143	288
11	STS-13 (41-C) Challenger	4/6/84	0858	10.149	16	56	21.5 18.6	320 275	37,700	176	289
12	STS-41D Discovery	8/30/84	0842 <sup>f</sup>	10.172	26	81	3.0 3.6	106 39	40,300	44	270
13	STS-41G Challenger	10/5/84	0703 <sup>f</sup>	10.210	23	60	16.5 14.8	73 58	40,600	78	303
14	STS-51A Discovery	11/8/84	0715	10.227	20	59	23.0 31.1	24 10	33,100	131	272
15	STS-51C Discovery	1/24/85	1450	10.173	18	46	17.1 15.5	228 253	42,900	199	265

Wind directional change observed  
at Pad just prior to L+0. Onset  
of sea breeze.

17 min countdown delay due  
to adverse weather conditions.

1 day delay due to excessive  
wind loads, calculated at high  
altitudes.

1 day delay due to extreme  
cold surface temperatures.

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TABLE I. (Concluded)

Seq. No.	Vehicle Data <sup>h</sup>			Surface Observations					Inflight Conditions Max. Wind Below 60,000 ft			Count Down and Launch Comments of Meteorological Significance
	Vehicle No.	Launch Date	Time (EST) Nearest Minute	Thermodynamic <sup>a</sup>		Wind <sup>b</sup>			Alt. (ft)	Speed (ft/sec)	Dir. (deg)	
				Press. <sup>c</sup> N/cm <sup>2</sup>	Temp. (°C)	Rel. Hum. (%)	Speed (ft/sec)	Dir. (deg)				
16	STS-51D Discovery	4/12/85	1359	10.257	21	55	19.9 22.3	82 82	42,600	134	265	55-min delay due to a ship in the SRB impact area, and concerns over potential weather related impacts (cloud cover).
17	STS-51B Challenger	4/29/85	1202 <sup>f</sup>	10.138	27	65	11.5 18.4	005 337	32,900 40,700	68 68	320 297	
18	STS-51G Discovery	6/17/85	0733 <sup>f</sup>	10.201	23	91	2.9 11.8	201 206	40,100 46,700	55 55	298 302	
19	STS-51F Challenger	7/29/85	1700 <sup>f</sup>	10.174	28	72	14.9 13.4	101 113	48,000	53	035	8/24 launch scrub due to unexceptionable weather in launch area. Rain during countdown.
20	STS-51I Discovery	8/27/85	0658 <sup>f</sup>	10.225	24	86	14.2 16.6	073 070	41,000	43	123	1/7 launch scrub due to unexceptionable weather at TAL sites. 1/10 launch scrub due to heavy rain in launch area.
21	STS-51J Atlantis	10/3/85	1115 <sup>f</sup>	10.185	28	79	17.0 13.7	213 171	48,000	48	283	
22	STS-61A Challenger	10/30/85	1200	10.059	28	72	12.7 14.1	217 174	43,000	81	218	
23	STS-61B Atlantis	11/26/85	1929	10.202	23	81	10.1 10.4	165 112	49,300	75	270	1/26 launch scrub due in part to potential bad weather associated with frontal passage. 1/27 launch scrub due in part to strong cross winds at X68. 1/28 2-hr delay due in part to cold early morning temps.
24	STS-61C Columbia	1/12/86	0655	10.206	12	84	15.4 18.6	323 342	40,000	221	263	1 hr and 37 min delay due to light winds.
25 <sup>j</sup>	STS-51L <sup>i</sup> Challenger	1/28/86	1138	10.253	3	27	20.1 15.3	331 262	42,000	174	264	1 day delay due to excessive wind loads, calculated at high altitudes.
26 <sup>j</sup>	STS-26 Discovery	9/29/88	1137 <sup>f</sup>	10.182	29	56	13.7 13.5	058 047	53,100	44	304	2 hr delay due to fog and strong winds aloft.
27 <sup>j</sup>	STS-27 Atlantis	12/2/88	930	10.270	14	50	25.5 22.0	314 352	40,200	187	245	59 min delay due to cloud cover over the launch area.
28 <sup>j</sup>	STS-29 Discovery	3/13/89	957	10.190	18	88	16.9	242	45,200	105	283	
29 <sup>j</sup>	STS-30 Atlantis	5/4/89	1447 <sup>f</sup>	10.200	26	57	21.6	106	44,200	157	255	

- a. Pad 39A thermodynamic measurements taken at approximately 1.2 m (4 ft) above natural grade at camera site No. 3.  
b. 1-min average prior to L+0 of 60-ft PLP winds measured above natural grade. 275-ft FSS wind measurement was not available.  
c. Pressure measurement applicable to 21 ft above MSL unless otherwise indicated.  
d. Pressure measurement applicable to 14 ft above MSL.  
e. 10-sec average prior to L+0.  
f. Eastern daylight time.  
g. 30-sec average prior to L+0.  
h. All vehicles launched from LC 39A except where noted.  
i. Shuttle exploded in flight.  
j. Vehicle launched from 39B.

TABLE 2. SYSTEMS USED TO MEASURE UPPER AIR WIND DATA FOR STS-30 ASCENT

Type of Data	Date: May 4, 1989		Portion of Data Used			
	Release Time		Start		End	
	Time (u.t.) (hr:min)	Time After L+0 (min)	Altitude m (ft)	Time After L+0 (min)	Altitude m (ft)	Time After L+0 (min)
FPS-16 Jimsphere	19:02	15	6 (21)	15	16,459 (54,000)	69
MSS Rawinsonde	18:20	-27	16,764 (55,000)	-27	28,651 (94,000)	12

TABLE 3. SURFACE OBSERVATIONS AT STS-30 LAUNCH TIME

Location <sup>a</sup>	Time After L+0 (min)	Pressure (MSL) N/cm <sup>2</sup> (psia)	Temperature K (°F)	Dew Point K (°F)	Relative Humidity (%)	Visibility km (miles)	Sky Cover			Wind	
							Cloud Amount*	Cloud Type	Height of Base Meters (ft)	Speed ft/sec (kt)	Direction (deg)
NASA Space Shuttle Runway X68 <sup>e</sup> Winds Measured at 10.4 m (34 ft)	0	10.200 (14.794)	300.9 (82.0)	289.8 (62.0)	50	16 (10)	1	Cumulus	1,158 (3,800)	18.6 (11.0)	130
	+1	10.200 (14.794)	298.7 (78.0)	291.5 (65.0)	64	16 (10)	3	Stratocumulus	1,524 (5,000)		
CCAFS XMR <sup>c</sup> Surface Measurements							6	Cumulus	1,067 (3,500)	13.5 (8.0)	110
							4	Stratocumulus	1,524 (5,000)		
Pad 39B <sup>d</sup> Lightpole SE 18.3 m (60.0 ft)	0	10.200 (14.794)	299.3 (79.0)	289.8 (62.0)	57	-	-	-	-	21.6 (12.8)	106

\*10/10 total sky cover at XMR and 4/10 total sky cover at X68.

- a. Altitudes of measurements are above natural grade, except where noted.  
b. Approximately 5-min average prior to L+0.  
c. Balloon release site.  
d. Pad 39B thermodynamic measurements are taken at camera site No. 3, approximately 6.4 m (21 ft) above MSL.  
e. Official STS-30 sky observational site.

TABLE 4. STS-30 PRE-LAUNCH THROUGH LAUNCH KSC PAD 39B  
ATMOSPHERIC MEASUREMENTS<sup>a</sup>

Hourly Atmospheric Measurements <sup>a</sup>					Sky Condition <sup>b</sup>				
4 May 1989 Time u.t.	Temperature (°F)	Dew Point (°F)	Relative Humidity (%)	60' Level (SE)		Clouds	Total Sky Cover	Vis. (mi.)	Other Remarks
				WS	Kt				
1300	75	64	69	10	81	Scattered at 3,000 ft, broken at 5,000 and 29,000 ft	9/10	10	
1400	75	63	67	12	89	Scattered at 3,500 ft, broken at 4,600 and 29,000 ft	9/10	10	
1500	76	63	64	13	98	Broken at 3,600 ft	9/10	10	
1600	77	63	60	14	103	Scattered at 3,700 ft	4/10	10	
1700	77	62	59	13	111	Broken at 3,700 ft	9/10	10	
1800	78	62	58	12	103	Scattered at 4,000 ft, broken at 5,500 ft	9/10	10	
L+0 <sup>c</sup> 1847	79	62	57	13	106	Scattered at 3,800 and 5,000 ft	4/10	10	

a. Hourly pad observations (obtained via MSFC/HOSC) averaged over 5 min, centered on the hour.

b. Sky observations taken at the Shuttle runway site X68.

c. L+0 PAD wind and thermodynamic parameters obtained from HOSC strip charts. The SE anemometer was used at the 60 ft level for L+0 wind conditions (approximately 5 min average prior to L+0).

TABLE 5. STS-30 ASCENT ATMOSPHERIC DATA TAPE

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
21.	11.81	130.00	25.51	0.1018E+04	0.1179E+04	17.51
100.	12.47	124.00	25.22	0.1015E+04	0.1177E+04	17.49
200.	13.45	120.00	24.85	0.1012E+04	0.1174E+04	17.46
300.	14.11	117.00	24.48	0.1008E+04	0.1171E+04	17.42
400.	14.76	116.00	24.12	0.1005E+04	0.1169E+04	17.39
500.	12.80	99.00	23.75	0.1001E+04	0.1166E+04	17.36
600.	16.40	92.00	23.38	0.9978E+03	0.1163E+04	17.33
700.	21.00	93.00	23.01	0.9944E+03	0.1161E+04	17.30
800.	23.95	93.00	22.65	0.9909E+03	0.1158E+04	17.27
900.	21.00	99.00	22.28	0.9875E+03	0.1156E+04	17.24
1000.	21.65	105.00	21.91	0.9841E+03	0.1153E+04	17.21
1100.	19.36	102.00	21.60	0.9807E+03	0.1150E+04	17.17
1200.	21.00	100.00	21.29	0.9772E+03	0.1147E+04	17.13
1300.	23.62	102.00	20.98	0.9738E+03	0.1145E+04	17.09
1400.	25.59	105.00	20.67	0.9704E+03	0.1142E+04	17.05
1500.	26.57	108.00	20.36	0.9670E+03	0.1139E+04	17.01
1600.	23.62	111.00	20.05	0.9636E+03	0.1136E+04	16.97
1700.	23.95	107.00	19.74	0.9602E+03	0.1133E+04	16.93
1800.	23.62	104.00	19.43	0.9569E+03	0.1131E+04	16.89
1900.	22.64	106.00	19.12	0.9535E+03	0.1128E+04	16.85
2000.	21.33	114.00	18.81	0.9502E+03	0.1125E+04	16.81
2100.	22.31	113.00	18.53	0.9468E+03	0.1122E+04	16.60
2200.	23.29	110.00	18.25	0.9435E+03	0.1119E+04	16.39
2300.	22.97	106.00	17.97	0.9401E+03	0.1117E+04	16.18
2400.	22.31	115.00	17.69	0.9368E+03	0.1114E+04	15.97
2500.	23.95	117.00	17.41	0.9335E+03	0.1111E+04	15.76
2600.	27.89	113.00	17.13	0.9301E+03	0.1108E+04	15.55
2700.	24.28	113.00	16.85	0.9268E+03	0.1105E+04	15.34
2800.	22.31	120.00	16.57	0.9235E+03	0.1103E+04	15.13
2900.	21.98	126.00	16.29	0.9203E+03	0.1100E+04	14.92
3000.	26.57	124.00	16.01	0.9170E+03	0.1097E+04	14.71
3100.	26.25	121.00	15.82	0.9137E+03	0.1094E+04	14.48
3200.	25.92	118.00	15.63	0.9105E+03	0.1091E+04	14.25
3300.	23.62	120.00	15.44	0.9072E+03	0.1088E+04	14.02
3400.	22.64	125.00	15.25	0.9040E+03	0.1085E+04	13.79
3500.	24.61	129.00	15.06	0.9008E+03	0.1082E+04	13.56
3600.	27.56	127.00	14.87	0.8975E+03	0.1079E+04	13.33
3700.	27.56	122.00	14.68	0.8943E+03	0.1076E+04	13.10
3800.	24.93	117.00	14.49	0.8911E+03	0.1072E+04	12.87
3900.	21.33	124.00	14.30	0.8880E+03	0.1069E+04	12.64
4000.	22.97	125.00	14.11	0.8848E+03	0.1066E+04	12.41
4100.	23.62	119.00	14.04	0.8816E+03	0.1063E+04	12.06
4200.	19.03	118.00	13.97	0.8784E+03	0.1060E+04	11.71
4300.	18.37	126.00	13.90	0.8753E+03	0.1056E+04	11.36
4400.	21.33	124.00	13.83	0.8721E+03	0.1053E+04	11.01
4500.	21.98	114.00	13.76	0.8690E+03	0.1049E+04	10.66
4600.	16.08	118.00	13.69	0.8659E+03	0.1046E+04	10.31
4700.	15.75	121.00	13.62	0.8628E+03	0.1042E+04	9.96
4800.	14.11	121.00	13.55	0.8597E+03	0.1039E+04	9.61
4900.	11.15	129.00	13.48	0.8566E+03	0.1036E+04	9.26

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
5000.	13.12	134.00	13.41	0.8535E+03	0.1032E+04	8.91
5100.	17.72	119.00	13.34	0.8504E+03	0.1029E+04	8.49
5200.	10.50	124.00	13.27	0.8474E+03	0.1026E+04	8.07
5300.	10.50	144.00	13.20	0.8443E+03	0.1022E+04	7.65
5400.	13.12	142.00	13.13	0.8412E+03	0.1019E+04	7.23
5500.	12.80	138.00	13.06	0.8382E+03	0.1016E+04	6.81
5600.	10.50	146.00	12.99	0.8352E+03	0.1012E+04	6.39
5700.	10.50	158.00	12.92	0.8322E+03	0.1009E+04	5.97
5800.	4.27	145.00	12.85	0.8292E+03	0.1006E+04	5.55
5900.	5.91	159.00	12.78	0.8262E+03	0.1003E+04	5.13
6000.	8.20	179.00	12.71	0.8232E+03	0.9993E+03	4.71
6100.	13.45	195.00	12.52	0.8202E+03	0.9964E+03	4.43
6200.	17.06	189.00	12.33	0.8172E+03	0.9935E+03	4.15
6300.	14.76	189.00	12.14	0.8143E+03	0.9906E+03	3.87
6400.	10.17	200.00	11.95	0.8113E+03	0.9877E+03	3.59
6500.	13.78	199.00	11.76	0.8084E+03	0.9848E+03	3.31
6600.	13.45	198.00	11.57	0.8054E+03	0.9820E+03	3.03
6700.	12.80	196.00	11.38	0.8025E+03	0.9791E+03	2.75
6800.	12.14	194.00	11.19	0.7996E+03	0.9763E+03	2.47
6900.	11.48	193.00	11.00	0.7967E+03	0.9734E+03	2.19
7000.	11.15	191.00	10.81	0.7938E+03	0.9706E+03	1.91
7100.	10.50	189.00	10.59	0.7909E+03	0.9678E+03	1.68
7200.	10.17	186.00	10.37	0.7880E+03	0.9651E+03	1.45
7300.	9.84	138.00	10.15	0.7851E+03	0.9624E+03	1.22
7400.	2.30	85.00	9.93	0.7823E+03	0.9596E+03	0.99
7500.	1.64	161.00	9.71	0.7794E+03	0.9569E+03	0.76
7600.	6.89	153.00	9.49	0.7766E+03	0.9542E+03	0.53
7700.	13.45	115.00	9.27	0.7737E+03	0.9515E+03	0.30
7800.	15.42	126.00	9.05	0.7709E+03	0.9488E+03	0.07
7900.	16.40	122.00	8.83	0.7681E+03	0.9461E+03	-0.16
8000.	16.08	111.00	8.61	0.7653E+03	0.9434E+03	-0.39
8100.	13.78	107.00	8.46	0.7625E+03	0.9405E+03	-0.59
8200.	10.50	91.00	8.31	0.7597E+03	0.9376E+03	-0.79
8300.	9.84	106.00	8.16	0.7569E+03	0.9346E+03	-0.99
8400.	6.56	66.00	8.01	0.7541E+03	0.9317E+03	-1.19
8500.	1.97	97.00	7.86	0.7513E+03	0.9288E+03	-1.39
8600.	1.97	241.00	7.71	0.7486E+03	0.9259E+03	-1.59
8700.	1.64	244.00	7.56	0.7458E+03	0.9230E+03	-1.79
8800.	1.97	241.00	7.41	0.7431E+03	0.9202E+03	-1.99
8900.	0.33	278.00	7.26	0.7403E+03	0.9173E+03	-2.19
9000.	1.97	75.00	7.11	0.7376E+03	0.9144E+03	-2.39
9100.	2.95	95.00	7.01	0.7349E+03	0.9114E+03	-2.63
9200.	3.61	132.00	6.91	0.7322E+03	0.9084E+03	-2.87
9300.	1.31	102.00	6.81	0.7295E+03	0.9054E+03	-3.11
9400.	1.97	132.00	6.71	0.7268E+03	0.9024E+03	-3.35
9500.	2.95	55.00	6.61	0.7241E+03	0.8994E+03	-3.59
9600.	2.62	32.00	6.51	0.7214E+03	0.8965E+03	-3.83
9700.	2.30	36.00	6.41	0.7187E+03	0.8935E+03	-4.07
9800.	3.61	22.00	6.31	0.7161E+03	0.8906E+03	-4.31
9900.	3.94	12.00	6.21	0.7134E+03	0.8876E+03	-4.55

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
10000.	2.95	310.00	6.11	0.7108E+03	0.8847E+03	-4.79
10100.	2.62	248.00	5.90	0.7082E+03	0.8822E+03	-5.60
10200.	0.66	212.00	5.69	0.7055E+03	0.8797E+03	-6.41
10300.	1.31	22.00	5.48	0.7029E+03	0.8771E+03	-7.22
10400.	4.59	334.00	5.27	0.7003E+03	0.8746E+03	-8.03
10500.	5.25	312.00	5.06	0.6977E+03	0.8721E+03	-8.84
10600.	4.59	287.00	4.85	0.6951E+03	0.8696E+03	-9.65
10700.	4.92	264.00	4.64	0.6925E+03	0.8671E+03	-10.46
10800.	4.92	247.00	4.43	0.6899E+03	0.8646E+03	-11.27
10900.	3.94	247.00	4.22	0.6874E+03	0.8621E+03	-12.08
11000.	2.95	245.00	4.01	0.6848E+03	0.8597E+03	-12.89
11100.	1.97	328.00	3.87	0.6822E+03	0.8569E+03	-13.11
11200.	7.22	291.00	3.73	0.6797E+03	0.8541E+03	-13.33
11300.	8.86	285.00	3.59	0.6771E+03	0.8514E+03	-13.55
11400.	10.83	275.00	3.45	0.6746E+03	0.8486E+03	-13.77
11500.	9.51	264.00	3.31	0.6721E+03	0.8459E+03	-13.99
11600.	9.19	254.00	3.17	0.6696E+03	0.8432E+03	-14.21
11700.	8.53	245.00	3.03	0.6671E+03	0.8405E+03	-14.43
11800.	9.84	249.00	2.89	0.6646E+03	0.8378E+03	-14.65
11900.	12.47	260.00	2.75	0.6621E+03	0.8351E+03	-14.87
12000.	14.11	253.00	2.61	0.6596E+03	0.8324E+03	-15.09
12100.	16.40	245.00	2.37	0.6571E+03	0.8299E+03	-14.72
12200.	13.78	239.00	2.13	0.6546E+03	0.8275E+03	-14.35
12300.	10.83	241.00	1.89	0.6523E+03	0.8251E+03	-13.98
12400.	9.84	253.00	1.65	0.6497E+03	0.8226E+03	-13.61
12500.	11.15	260.00	1.41	0.6473E+03	0.8202E+03	-13.24
12600.	12.47	258.00	1.17	0.6448E+03	0.8178E+03	-12.87
12700.	13.45	249.00	0.93	0.6424E+03	0.8154E+03	-12.50
12800.	14.11	246.00	0.69	0.6400E+03	0.8130E+03	-12.13
12900.	13.45	257.00	0.45	0.6376E+03	0.8106E+03	-11.76
13000.	13.45	258.00	0.21	0.6352E+03	0.8083E+03	-11.39
13100.	15.42	239.00	-0.02	0.6328E+03	0.8059E+03	-11.55
13200.	13.78	232.00	-0.25	0.6304E+03	0.8035E+03	-11.71
13300.	12.80	238.00	-0.48	0.6280E+03	0.8011E+03	-11.87
13400.	14.76	248.00	-0.71	0.6256E+03	0.7987E+03	-12.03
13500.	16.40	241.00	-0.94	0.6232E+03	0.7964E+03	-12.19
13600.	13.78	241.00	-1.17	0.6208E+03	0.7940E+03	-12.35
13700.	14.44	253.00	-1.40	0.6184E+03	0.7917E+03	-12.51
13800.	18.37	249.00	-1.63	0.6161E+03	0.7893E+03	-12.67
13900.	16.08	244.00	-1.86	0.6137E+03	0.7870E+03	-12.83
14000.	16.08	252.00	-2.09	0.6114E+03	0.7847E+03	-12.99
14100.	18.37	247.00	-2.30	0.6091E+03	0.7823E+03	-13.36
14200.	16.40	244.00	-2.51	0.6067E+03	0.7799E+03	-13.73
14300.	18.04	245.00	-2.72	0.6044E+03	0.7776E+03	-14.10
14400.	18.04	240.00	-2.93	0.6021E+03	0.7752E+03	-14.47
14500.	20.01	245.00	-3.14	0.5998E+03	0.7729E+03	-14.84
14600.	20.01	244.00	-3.35	0.5975E+03	0.7706E+03	-15.21
14700.	20.34	244.00	-3.56	0.5952E+03	0.7682E+03	-15.58
14800.	20.67	243.00	-3.77	0.5929E+03	0.7659E+03	-15.95
14900.	20.67	243.00	-3.98	0.5907E+03	0.7636E+03	-16.32



TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
15000.	21.00	242.00	-4.19	0.5884E+03	0.7613E+03	-16.69
15100.	21.98	250.00	-4.34	0.5861E+03	0.7588E+03	-17.26
15200.	21.98	250.00	-4.49	0.5839E+03	0.7564E+03	-17.83
15300.	22.31	256.00	-4.64	0.5816E+03	0.7539E+03	-18.40
15400.	24.28	254.00	-4.79	0.5794E+03	0.7514E+03	-18.97
15500.	22.97	254.00	-4.94	0.5771E+03	0.7490E+03	-19.54
15600.	24.28	253.00	-5.09	0.5749E+03	0.7465E+03	-20.11
15700.	22.97	253.00	-5.24	0.5727E+03	0.7441E+03	-20.68
15800.	25.59	255.00	-5.39	0.5705E+03	0.7417E+03	-21.25
15900.	25.26	255.00	-5.54	0.5683E+03	0.7393E+03	-21.82
16000.	27.23	262.00	-5.69	0.5661E+03	0.7369E+03	-22.39
16100.	27.23	262.00	-5.77	0.5639E+03	0.7342E+03	-22.89
16200.	28.22	269.00	-5.85	0.5617E+03	0.7316E+03	-23.39
16300.	26.90	267.00	-5.93	0.5595E+03	0.7290E+03	-23.89
16400.	28.22	273.00	-6.01	0.5574E+03	0.7264E+03	-24.39
16500.	28.87	272.00	-6.09	0.5552E+03	0.7238E+03	-24.89
16600.	31.82	279.00	-6.17	0.5530E+03	0.7213E+03	-25.39
16700.	33.14	276.00	-6.25	0.5508E+03	0.7187E+03	-25.89
16800.	33.79	275.00	-6.33	0.5488E+03	0.7161E+03	-26.39
16900.	36.09	269.00	-6.41	0.5466E+03	0.7136E+03	-26.89
17000.	32.81	267.00	-6.49	0.5445E+03	0.7110E+03	-27.39
17100.	32.81	267.00	-6.71	0.5424E+03	0.7088E+03	-27.60
17200.	34.78	263.00	-6.93	0.5403E+03	0.7067E+03	-27.81
17300.	32.81	266.00	-7.15	0.5382E+03	0.7045E+03	-28.02
17400.	34.45	268.00	-7.37	0.5361E+03	0.7024E+03	-28.23
17500.	34.78	263.00	-7.59	0.5340E+03	0.7002E+03	-28.44
17600.	33.14	267.00	-7.81	0.5319E+03	0.6981E+03	-28.65
17700.	35.43	268.00	-8.03	0.5299E+03	0.6960E+03	-28.86
17800.	37.07	264.00	-8.25	0.5278E+03	0.6938E+03	-29.07
17900.	34.78	263.00	-8.47	0.5257E+03	0.6917E+03	-29.28
18000.	34.78	266.00	-8.69	0.5237E+03	0.6896E+03	-29.49
18100.	38.39	265.00	-8.82	0.5216E+03	0.6872E+03	-29.64
18200.	39.37	261.00	-8.95	0.5196E+03	0.6849E+03	-29.79
18300.	36.09	262.00	-9.08	0.5176E+03	0.6825E+03	-29.94
18400.	36.09	267.00	-9.21	0.5155E+03	0.6802E+03	-30.09
18500.	38.71	265.00	-9.34	0.5135E+03	0.6778E+03	-30.24
18600.	39.70	259.00	-9.47	0.5115E+03	0.6755E+03	-30.39
18700.	37.73	258.00	-9.60	0.5095E+03	0.6732E+03	-30.54
18800.	39.04	259.00	-9.73	0.5075E+03	0.6709E+03	-30.69
18900.	42.65	259.00	-9.86	0.5055E+03	0.6686E+03	-30.84
19000.	45.60	258.00	-9.99	0.5035E+03	0.6663E+03	-30.99
19100.	44.62	254.00	-10.21	0.5015E+03	0.6642E+03	-31.13
19200.	43.31	256.00	-10.43	0.4995E+03	0.6622E+03	-31.27
19300.	44.29	259.00	-10.65	0.4976E+03	0.6601E+03	-31.41
19400.	46.26	259.00	-10.87	0.4956E+03	0.6581E+03	-31.55
19500.	44.62	258.00	-11.09	0.4937E+03	0.6560E+03	-31.69
19600.	42.65	259.00	-11.31	0.4917E+03	0.6540E+03	-31.83
19700.	42.32	262.00	-11.53	0.4898E+03	0.6520E+03	-31.97
19800.	45.93	261.00	-11.75	0.4878E+03	0.6499E+03	-32.11
19900.	45.93	259.00	-11.97	0.4859E+03	0.6479E+03	-32.25

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
20000.	45.93	260.00	-12.19	0.4840E+03	0.6459E+03	-32.39
20100.	47.57	263.00	-12.41	0.4801E+03	0.6439E+03	-32.57
20200.	49.87	262.00	-12.63	0.4801E+03	0.6418E+03	-32.75
20300.	47.90	260.00	-12.85	0.4782E+03	0.6398E+03	-32.93
20400.	46.26	262.00	-13.07	0.4763E+03	0.6378E+03	-33.11
20500.	47.90	264.00	-13.29	0.4744E+03	0.6358E+03	-33.29
20600.	47.57	260.00	-13.51	0.4725E+03	0.6338E+03	-33.47
20700.	45.28	262.00	-13.73	0.4706E+03	0.6318E+03	-33.65
20800.	47.24	264.00	-13.95	0.4687E+03	0.6298E+03	-33.83
20900.	47.57	261.00	-14.17	0.4669E+03	0.6278E+03	-34.01
21000.	46.59	262.00	-14.39	0.4650E+03	0.6259E+03	-34.19
21100.	48.88	261.00	-14.57	0.4631E+03	0.6238E+03	-34.31
21200.	46.59	259.00	-14.75	0.4613E+03	0.6217E+03	-34.43
21300.	44.29	261.00	-14.93	0.4594E+03	0.6197E+03	-34.55
21400.	44.95	262.00	-15.11	0.4576E+03	0.6176E+03	-34.67
21500.	43.96	261.00	-15.29	0.4558E+03	0.6156E+03	-34.79
21600.	45.28	262.00	-15.47	0.4539E+03	0.6135E+03	-34.91
21700.	44.62	259.00	-15.65	0.4521E+03	0.6115E+03	-35.03
21800.	43.31	262.00	-15.83	0.4503E+03	0.6095E+03	-35.15
21900.	45.28	262.00	-16.01	0.4485E+03	0.6075E+03	-35.27
22000.	43.64	261.00	-16.19	0.4467E+03	0.6055E+03	-35.39
22100.	43.96	262.00	-16.46	0.4449E+03	0.6036E+03	-35.47
22200.	42.98	260.00	-16.73	0.4431E+03	0.6018E+03	-35.55
22300.	42.32	262.00	-17.00	0.4413E+03	0.6000E+03	-35.63
22400.	42.32	261.00	-17.27	0.4395E+03	0.5982E+03	-35.71
22500.	44.29	261.00	-17.54	0.4377E+03	0.5964E+03	-35.79
22600.	45.28	260.00	-17.81	0.4359E+03	0.5946E+03	-35.87
22700.	44.29	259.00	-18.08	0.4342E+03	0.5928E+03	-35.95
22800.	45.28	258.00	-18.35	0.4324E+03	0.5910E+03	-36.03
22900.	43.96	256.00	-18.62	0.4306E+03	0.5893E+03	-36.11
23000.	45.28	258.00	-18.89	0.4289E+03	0.5875E+03	-36.19
23100.	44.29	256.00	-19.14	0.4271E+03	0.5857E+03	-36.41
23200.	43.96	259.00	-19.39	0.4254E+03	0.5839E+03	-36.63
23300.	44.95	255.00	-19.64	0.4237E+03	0.5821E+03	-36.85
23400.	43.96	255.00	-19.89	0.4219E+03	0.5803E+03	-37.07
23500.	45.60	253.00	-20.14	0.4202E+03	0.5785E+03	-37.29
23600.	43.31	254.00	-20.39	0.4185E+03	0.5767E+03	-37.51
23700.	44.29	253.00	-20.64	0.4168E+03	0.5749E+03	-37.73
23800.	43.64	256.00	-20.89	0.4151E+03	0.5731E+03	-37.95
23900.	44.95	255.00	-21.14	0.4134E+03	0.5713E+03	-38.17
24000.	43.96	252.00	-21.39	0.4117E+03	0.5696E+03	-38.39
24100.	46.92	254.00	-21.64	0.4100E+03	0.5678E+03	-38.50
24200.	45.93	250.00	-21.89	0.4083E+03	0.5660E+03	-38.61
24300.	43.64	252.00	-22.14	0.4066E+03	0.5642E+03	-38.72
24400.	45.28	252.00	-22.39	0.4049E+03	0.5624E+03	-38.83
24500.	43.31	254.00	-22.64	0.4033E+03	0.5607E+03	-38.94
24600.	46.26	255.00	-22.89	0.4016E+03	0.5589E+03	-39.05
24700.	45.93	253.00	-23.14	0.3999E+03	0.5572E+03	-39.16
24800.	45.93	258.00	-23.39	0.3983E+03	0.5554E+03	-39.27
24900.	45.93	256.00	-23.64	0.3966E+03	0.5537E+03	-39.38

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
25000.	46.26	255.00	-23.89	0.3950E+03	0.5520E+03	-39.49
25100.	48.88	253.00	-24.10	0.3934E+03	0.5501E+03	-39.55
25200.	45.93	249.00	-24.31	0.3917E+03	0.5483E+03	-39.61
25300.	47.24	249.00	-24.52	0.3901E+03	0.5465E+03	-39.67
25400.	47.57	248.00	-24.73	0.3885E+03	0.5447E+03	-39.73
25500.	47.24	246.00	-24.94	0.3869E+03	0.5429E+03	-39.79
25600.	50.52	246.00	-25.15	0.3853E+03	0.5411E+03	-39.85
25700.	47.90	245.00	-25.36	0.3837E+03	0.5393E+03	-39.91
25800.	50.52	245.00	-25.57	0.3821E+03	0.5375E+03	-39.97
25900.	52.49	246.00	-25.78	0.3805E+03	0.5357E+03	-40.03
26000.	55.12	245.00	-25.99	0.3789E+03	0.5340E+03	-40.09
26100.	55.12	246.00	-26.20	0.3773E+03	0.5321E+03	-39.88
26200.	54.13	246.00	-26.41	0.3757E+03	0.5304E+03	-39.67
26300.	55.12	248.00	-26.62	0.3741E+03	0.5286E+03	-39.46
26400.	57.41	251.00	-26.83	0.3725E+03	0.5268E+03	-39.25
26500.	57.74	249.00	-27.04	0.3710E+03	0.5250E+03	-39.04
26600.	60.04	251.00	-27.25	0.3694E+03	0.5232E+03	-38.83
26700.	62.66	250.00	-27.46	0.3678E+03	0.5215E+03	-38.62
26800.	61.35	250.00	-27.67	0.3663E+03	0.5197E+03	-38.41
26900.	61.68	252.00	-27.88	0.3647E+03	0.5179E+03	-38.20
27000.	59.06	251.00	-28.09	0.3632E+03	0.5162E+03	-37.99
27100.	59.71	254.00	-28.33	0.3617E+03	0.5145E+03	-38.44
27200.	60.04	251.00	-28.57	0.3601E+03	0.5128E+03	-38.89
27300.	58.40	252.00	-28.81	0.3586E+03	0.5112E+03	-39.34
27400.	60.37	254.00	-29.05	0.3571E+03	0.5095E+03	-39.79
27500.	59.71	255.00	-29.29	0.3556E+03	0.5079E+03	-40.24
27600.	57.41	256.00	-29.53	0.3541E+03	0.5062E+03	-40.69
27700.	59.38	257.00	-29.77	0.3526E+03	0.5046E+03	-41.14
27800.	59.71	254.00	-30.01	0.3511E+03	0.5029E+03	-41.59
27900.	60.37	259.00	-30.25	0.3496E+03	0.5013E+03	-42.04
28000.	62.01	257.00	-30.49	0.3481E+03	0.4997E+03	-42.49
28100.	61.02	257.00	-30.78	0.3466E+03	0.4981E+03	-42.69
28200.	64.63	258.00	-31.07	0.3451E+03	0.4966E+03	-42.89
28300.	61.35	258.00	-31.36	0.3437E+03	0.4951E+03	-43.09
28400.	62.99	259.00	-31.65	0.3422E+03	0.4935E+03	-43.29
28500.	61.02	259.00	-31.94	0.3407E+03	0.4920E+03	-43.49
28600.	61.02	259.00	-32.23	0.3393E+03	0.4905E+03	-43.69
28700.	59.38	258.00	-32.52	0.3378E+03	0.4890E+03	-43.89
28800.	60.04	258.00	-32.81	0.3364E+03	0.4875E+03	-44.09
28900.	59.38	258.00	-33.10	0.3349E+03	0.4860E+03	-44.29
29000.	58.40	259.00	-33.39	0.3335E+03	0.4845E+03	-44.49
29100.	58.40	259.00	-33.66	0.3321E+03	0.4829E+03	-44.64
29200.	57.09	259.00	-33.93	0.3306E+03	0.4814E+03	-44.79
29300.	59.71	262.00	-34.20	0.3292E+03	0.4798E+03	-44.94
29400.	57.41	264.00	-34.47	0.3277E+03	0.4783E+03	-45.09
29500.	58.40	265.00	-34.74	0.3263E+03	0.4768E+03	-45.24
29600.	59.71	266.00	-35.01	0.3249E+03	0.4752E+03	-45.39
29700.	62.01	265.00	-35.28	0.3235E+03	0.4737E+03	-45.54
29800.	61.68	265.00	-35.55	0.3221E+03	0.4722E+03	-45.69
29900.	61.35	269.00	-35.82	0.3207E+03	0.4707E+03	-45.84

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
30000.	61.02	267.00	-36.09	0.3193E+03	0.4692E+03	-45.99
30100.	61.68	272.00	-36.32	0.3179E+03	0.4676E+03	-46.30
30200.	61.68	271.00	-36.55	0.3165E+03	0.4660E+03	-46.61
30300.	62.34	273.00	-36.78	0.3151E+03	0.4644E+03	-46.92
30400.	62.01	274.00	-37.01	0.3137E+03	0.4628E+03	-47.23
30500.	62.01	273.00	-37.24	0.3124E+03	0.4612E+03	-47.54
30600.	60.70	271.00	-37.47	0.3110E+03	0.4597E+03	-47.85
30700.	60.37	273.00	-37.70	0.3096E+03	0.4581E+03	-48.16
30800.	59.38	269.00	-37.93	0.3083E+03	0.4565E+03	-48.47
30900.	59.71	271.00	-38.16	0.3069E+03	0.4550E+03	-48.78
31000.	59.38	271.00	-38.39	0.3056E+03	0.4535E+03	-49.09
31100.	60.37	270.00	-38.54	0.3043E+03	0.4517E+03	-49.27
31200.	58.07	271.00	-38.69	0.3029E+03	0.4500E+03	-49.45
31300.	57.74	272.00	-38.84	0.3016E+03	0.4483E+03	-49.63
31400.	58.07	272.00	-38.99	0.3002E+03	0.4467E+03	-49.81
31500.	58.40	273.00	-39.14	0.2989E+03	0.4450E+03	-49.99
31600.	58.40	272.00	-39.29	0.2976E+03	0.4433E+03	-50.17
31700.	57.41	272.00	-39.44	0.2963E+03	0.4416E+03	-50.35
31800.	57.74	275.00	-39.59	0.2950E+03	0.4400E+03	-50.53
31900.	57.74	275.00	-39.74	0.2937E+03	0.4383E+03	-50.71
32000.	58.07	274.00	-39.89	0.2924E+03	0.4367E+03	-50.89
32100.	57.41	272.00	-40.11	0.2911E+03	0.4351E+03	-51.15
32200.	57.09	272.00	-40.33	0.2898E+03	0.4336E+03	-51.41
32300.	57.09	271.00	-40.55	0.2885E+03	0.4321E+03	-51.67
32400.	58.07	271.00	-40.77	0.2872E+03	0.4305E+03	-51.93
32500.	57.74	268.00	-40.99	0.2859E+03	0.4290E+03	-52.19
32600.	57.41	269.00	-41.21	0.2847E+03	0.4275E+03	-52.45
32700.	57.41	266.00	-41.43	0.2834E+03	0.4260E+03	-52.71
32800.	58.73	267.00	-41.65	0.2821E+03	0.4245E+03	-52.97
32900.	60.37	263.00	-41.87	0.2809E+03	0.4230E+03	-53.23
33000.	59.71	265.00	-42.09	0.2796E+03	0.4215E+03	-53.49
33100.	62.66	265.00	-42.33	0.2783E+03	0.4201E+03	-53.70
33200.	60.04	265.00	-42.57	0.2771E+03	0.4186E+03	-53.91
33300.	61.35	266.00	-42.81	0.2759E+03	0.4172E+03	-54.12
33400.	59.38	267.00	-43.05	0.2746E+03	0.4157E+03	-54.33
33500.	59.06	269.00	-43.29	0.2734E+03	0.4143E+03	-54.54
33600.	60.04	266.00	-43.53	0.2722E+03	0.4129E+03	-54.75
33700.	62.34	267.00	-43.77	0.2709E+03	0.4115E+03	-54.96
33800.	66.60	265.00	-44.01	0.2697E+03	0.4100E+03	-55.17
33900.	64.96	267.00	-44.25	0.2685E+03	0.4086E+03	-55.38
34000.	65.29	270.00	-44.49	0.2673E+03	0.4072E+03	-55.59
34100.	67.59	271.00	-44.66	0.2661E+03	0.4057E+03	-55.75
34200.	68.24	270.00	-44.83	0.2649E+03	0.4041E+03	-55.91
34300.	71.85	271.00	-45.00	0.2637E+03	0.4026E+03	-56.07
34400.	71.52	269.00	-45.17	0.2625E+03	0.4011E+03	-56.23
34500.	73.16	266.00	-45.34	0.2613E+03	0.3995E+03	-56.39
34600.	74.80	265.00	-45.51	0.2601E+03	0.3980E+03	-56.55
34700.	77.43	264.00	-45.68	0.2589E+03	0.3965E+03	-56.71
34800.	75.46	265.00	-45.85	0.2577E+03	0.3950E+03	-56.87
34900.	79.07	267.00	-46.02	0.2566E+03	0.3935E+03	-57.03

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
35000.	81.04	263.00	-46.19	0.2554E+03	0.3920E+03	-57.19
35100.	80.38	260.00	-46.31	0.2542E+03	0.3904E+03	-57.28
35200.	79.07	262.00	-46.43	0.2531E+03	0.3889E+03	-57.37
35300.	88.58	261.00	-46.55	0.2519E+03	0.3873E+03	-57.46
35400.	88.58	261.00	-46.67	0.2508E+03	0.3857E+03	-57.55
35500.	91.54	260.00	-46.79	0.2496E+03	0.3842E+03	-57.64
35600.	95.80	258.00	-46.91	0.2485E+03	0.3826E+03	-57.73
35700.	96.46	256.00	-47.03	0.2474E+03	0.3811E+03	-57.82
35800.	97.44	256.00	-47.15	0.2462E+03	0.3796E+03	-57.91
35900.	101.71	255.00	-47.27	0.2451E+03	0.3780E+03	-58.00
36000.	100.39	255.00	-47.39	0.2440E+03	0.3765E+03	-58.09
36100.	103.35	253.00	-47.68	0.2429E+03	0.3752E+03	-58.33
36200.	103.67	251.00	-47.97	0.2418E+03	0.3740E+03	-58.57
36300.	104.99	252.00	-48.26	0.2406E+03	0.3728E+03	-58.81
36400.	105.64	252.00	-48.55	0.2395E+03	0.3715E+03	-59.05
36500.	106.63	252.00	-48.84	0.2384E+03	0.3703E+03	-59.29
36600.	109.25	251.00	-49.13	0.2373E+03	0.3691E+03	-59.53
36700.	109.91	251.00	-49.42	0.2362E+03	0.3678E+03	-59.77
36800.	109.25	251.00	-49.71	0.2352E+03	0.3666E+03	-60.01
36900.	110.56	250.00	-50.00	0.2341E+03	0.3654E+03	-60.25
37000.	114.17	249.00	-50.29	0.2330E+03	0.3642E+03	-60.49
37100.	117.13	249.00	-50.48	0.2319E+03	0.3628E+03	-60.66
37200.	116.80	251.00	-50.67	0.2308E+03	0.3614E+03	-60.83
37300.	117.78	251.00	-50.86	0.2298E+03	0.3601E+03	-61.00
37400.	118.77	252.00	-51.05	0.2287E+03	0.3587E+03	-61.17
37500.	120.73	252.00	-51.24	0.2276E+03	0.3574E+03	-61.34
37600.	122.05	252.00	-51.43	0.2266E+03	0.3560E+03	-61.51
37700.	124.02	252.00	-51.62	0.2255E+03	0.3546E+03	-61.68
37800.	124.67	254.00	-51.81	0.2245E+03	0.3533E+03	-61.85
37900.	124.34	254.00	-52.00	0.2234E+03	0.3520E+03	-62.02
38000.	127.62	256.00	-52.19	0.2224E+03	0.3506E+03	-62.19
38100.	128.61	254.00	-52.33	0.2214E+03	0.3492E+03	-62.32
38200.	129.59	256.00	-52.47	0.2203E+03	0.3478E+03	-62.45
38300.	127.30	255.00	-52.61	0.2193E+03	0.3464E+03	-62.58
38400.	127.95	255.00	-52.75	0.2183E+03	0.3450E+03	-62.71
38500.	130.91	257.00	-52.89	0.2172E+03	0.3436E+03	-62.84
38600.	129.59	254.00	-53.03	0.2162E+03	0.3422E+03	-62.97
38700.	131.89	256.00	-53.17	0.2152E+03	0.3408E+03	-63.10
38800.	134.51	257.00	-53.31	0.2142E+03	0.3394E+03	-63.23
38900.	136.81	254.00	-53.45	0.2132E+03	0.3381E+03	-63.36
39000.	138.12	256.00	-53.59	0.2122E+03	0.3367E+03	-63.49
39100.	138.12	255.00	-53.77	0.2112E+03	0.3354E+03	-63.65
39200.	140.09	255.00	-53.95	0.2102E+03	0.3340E+03	-63.81
39300.	139.76	255.00	-54.13	0.2092E+03	0.3327E+03	-63.97
39400.	137.47	255.00	-54.31	0.2082E+03	0.3314E+03	-64.13
39500.	137.47	255.00	-54.49	0.2072E+03	0.3301E+03	-64.29
39600.	135.83	256.00	-54.67	0.2062E+03	0.3288E+03	-64.45
39700.	136.81	254.00	-54.85	0.2052E+03	0.3275E+03	-64.61
39800.	137.47	256.00	-55.03	0.2042E+03	0.3262E+03	-64.77
39900.	138.78	256.00	-55.21	0.2033E+03	0.3249E+03	-64.93

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
40000.	138.78	255.00	-55.39	0.2023E+03	0.3236E+03	-65.09
40100.	138.45	255.00	-55.65	0.2013E+03	0.3225E+03	-65.32
40200.	139.44	254.00	-55.91	0.2004E+03	0.3213E+03	-65.55
40300.	139.44	256.00	-56.17	0.1994E+03	0.3202E+03	-65.78
40400.	143.04	258.00	-56.43	0.1985E+03	0.3191E+03	-66.01
40500.	137.14	259.00	-56.69	0.1975E+03	0.3179E+03	-66.24
40600.	144.03	259.00	-56.95	0.1966E+03	0.3168E+03	-66.47
40700.	145.34	257.00	-57.21	0.1957E+03	0.3157E+03	-66.70
40800.	144.36	260.00	-57.47	0.1947E+03	0.3145E+03	-66.93
40900.	147.64	260.00	-57.73	0.1938E+03	0.3134E+03	-67.16
41000.	146.65	259.00	-57.99	0.1929E+03	0.3123E+03	-67.39
41100.	145.34	262.00	-58.18	0.1920E+03	0.3111E+03	-67.62
41200.	147.31	259.00	-58.37	0.1910E+03	0.3099E+03	-67.85
41300.	147.31	258.00	-58.56	0.1901E+03	0.3086E+03	-68.08
41400.	146.65	261.00	-58.75	0.1892E+03	0.3074E+03	-68.31
41500.	150.92	260.00	-58.94	0.1883E+03	0.3062E+03	-68.54
41600.	148.95	262.00	-59.13	0.1874E+03	0.3050E+03	-68.77
41700.	151.57	260.00	-59.32	0.1865E+03	0.3038E+03	-69.00
41800.	152.56	260.00	-59.51	0.1856E+03	0.3026E+03	-69.23
41900.	153.22	261.00	-59.70	0.1847E+03	0.3014E+03	-69.46
42000.	153.54	261.00	-59.89	0.1838E+03	0.3002E+03	-69.69
42100.	151.25	259.00	-59.92	0.1829E+03	0.2988E+03	-69.92
42200.	154.86	259.00	-59.95	0.1820E+03	0.2974E+03	-70.15
42300.	155.18	256.00	-59.98	0.1811E+03	0.2960E+03	-70.38
42400.	154.53	261.00	-60.01	0.1803E+03	0.2946E+03	-70.61
42500.	152.89	259.00	-60.04	0.1794E+03	0.2933E+03	-70.84
42600.	153.54	261.00	-60.07	0.1785E+03	0.2919E+03	-71.07
42700.	150.92	258.00	-60.10	0.1777E+03	0.2905E+03	-71.30
42800.	150.59	257.00	-60.13	0.1768E+03	0.2891E+03	-71.53
42900.	152.56	258.00	-60.16	0.1760E+03	0.2878E+03	-71.76
43000.	153.54	256.00	-60.19	0.1751E+03	0.2864E+03	-71.99
43100.	151.25	254.00	-60.37	0.1742E+03	0.2853E+03	-72.22
43200.	154.53	253.00	-60.55	0.1734E+03	0.2841E+03	-72.45
43300.	154.20	253.00	-60.73	0.1725E+03	0.2830E+03	-72.68
43400.	151.90	255.00	-60.91	0.1717E+03	0.2818E+03	-72.91
43500.	155.18	255.00	-61.09	0.1708E+03	0.2807E+03	-73.14
43600.	155.18	254.00	-61.27	0.1700E+03	0.2795E+03	-73.37
43700.	153.87	255.00	-61.45	0.1692E+03	0.2784E+03	-73.60
43800.	154.53	255.00	-61.63	0.1683E+03	0.2773E+03	-73.83
43900.	153.87	254.00	-61.81	0.1675E+03	0.2761E+03	-74.06
44000.	153.87	253.00	-61.99	0.1667E+03	0.2750E+03	-74.29
44100.	156.17	256.00	-62.15	0.1659E+03	0.2739E+03	-74.52
44200.	156.50	255.00	-62.31	0.1651E+03	0.2727E+03	-74.75
44300.	154.20	255.00	-62.47	0.1643E+03	0.2716E+03	-74.98
44400.	154.20	255.00	-62.63	0.1635E+03	0.2705E+03	-75.21
44500.	151.25	255.00	-62.79	0.1627E+03	0.2694E+03	-75.44
44600.	150.92	258.00	-62.95	0.1619E+03	0.2682E+03	-75.67
44700.	149.61	256.00	-63.11	0.1611E+03	0.2671E+03	-75.90
44800.	149.28	254.00	-63.27	0.1603E+03	0.2660E+03	-76.13
44900.	151.25	253.00	-63.43	0.1595E+03	0.2649E+03	-76.36

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
45000.	150.92	255.00	-63.59	0.1587E+03	0.2638E+03	-9999.00
45100.	148.62	256.00	-63.75	0.1579E+03	0.2627E+03	-9999.00
45200.	151.57	254.00	-63.91	0.1571E+03	0.2616E+03	-9999.00
45300.	151.57	250.00	-64.07	0.1564E+03	0.2606E+03	-9999.00
45400.	148.95	257.00	-64.23	0.1556E+03	0.2595E+03	-9999.00
45500.	148.62	254.00	-64.39	0.1549E+03	0.2584E+03	-9999.00
45600.	147.31	257.00	-64.55	0.1541E+03	0.2573E+03	-9999.00
45700.	149.93	255.00	-64.71	0.1533E+03	0.2563E+03	-9999.00
45800.	148.62	257.00	-64.87	0.1526E+03	0.2552E+03	-9999.00
45900.	148.29	255.00	-65.03	0.1518E+03	0.2542E+03	-9999.00
46000.	150.26	252.00	-65.19	0.1511E+03	0.2531E+03	-9999.00
46100.	146.98	254.00	-65.45	0.1503E+03	0.2522E+03	-9999.00
46200.	148.95	251.00	-65.71	0.1496E+03	0.2512E+03	-9999.00
46300.	147.64	250.00	-65.97	0.1488E+03	0.2503E+03	-9999.00
46400.	146.65	250.00	-66.23	0.1481E+03	0.2493E+03	-9999.00
46500.	146.00	249.00	-66.49	0.1474E+03	0.2484E+03	-9999.00
46600.	145.67	248.00	-66.75	0.1466E+03	0.2475E+03	-9999.00
46700.	144.68	248.00	-67.01	0.1459E+03	0.2465E+03	-9999.00
46800.	143.70	250.00	-67.27	0.1452E+03	0.2456E+03	-9999.00
46900.	144.03	247.00	-67.53	0.1444E+03	0.2447E+03	-9999.00
47000.	145.67	247.00	-67.79	0.1437E+03	0.2438E+03	-9999.00
47100.	143.70	252.00	-67.93	0.1430E+03	0.2427E+03	-9999.00
47200.	142.72	248.00	-68.07	0.1423E+03	0.2416E+03	-9999.00
47300.	144.36	246.00	-68.21	0.1415E+03	0.2406E+03	-9999.00
47400.	140.75	251.00	-68.35	0.1408E+03	0.2395E+03	-9999.00
47500.	143.04	251.00	-68.49	0.1401E+03	0.2385E+03	-9999.00
47600.	140.09	249.00	-68.63	0.1394E+03	0.2374E+03	-9999.00
47700.	138.45	250.00	-68.77	0.1387E+03	0.2364E+03	-9999.00
47800.	139.44	251.00	-68.91	0.1380E+03	0.2354E+03	-9999.00
47900.	133.20	250.00	-69.05	0.1373E+03	0.2343E+03	-9999.00
48000.	142.06	250.00	-69.19	0.1366E+03	0.2333E+03	-9999.00
48100.	139.44	253.00	-69.39	0.1359E+03	0.2324E+03	-9999.00
48200.	138.45	251.00	-69.59	0.1352E+03	0.2314E+03	-9999.00
48300.	138.12	252.00	-69.79	0.1345E+03	0.2304E+03	-9999.00
48400.	137.14	251.00	-69.99	0.1338E+03	0.2295E+03	-9999.00
48500.	136.81	251.00	-70.19	0.1332E+03	0.2286E+03	-9999.00
48600.	134.84	252.00	-70.39	0.1325E+03	0.2276E+03	-9999.00
48700.	133.20	253.00	-70.59	0.1318E+03	0.2267E+03	-9999.00
48800.	134.19	255.00	-70.79	0.1311E+03	0.2257E+03	-9999.00
48900.	135.83	256.00	-70.99	0.1305E+03	0.2248E+03	-9999.00
49000.	135.50	253.00	-71.19	0.1298E+03	0.2239E+03	-9999.00
49100.	133.20	252.00	-71.28	0.1291E+03	0.2228E+03	-9999.00
49200.	132.22	257.00	-71.37	0.1285E+03	0.2218E+03	-9999.00
49300.	131.89	252.00	-71.46	0.1278E+03	0.2208E+03	-9999.00
49400.	125.00	257.00	-71.55	0.1272E+03	0.2197E+03	-9999.00
49500.	126.97	254.00	-71.64	0.1265E+03	0.2187E+03	-9999.00
49600.	124.67	251.00	-71.73	0.1259E+03	0.2177E+03	-9999.00
49700.	121.72	252.00	-71.82	0.1252E+03	0.2167E+03	-9999.00
49800.	122.38	251.00	-71.91	0.1246E+03	0.2156E+03	-9999.00
49900.	124.67	249.00	-72.00	0.1239E+03	0.2146E+03	-9999.00

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
5000.	123.69	249.00	-72.09	0.1233E+03	0.2136E+03	-9999.00
50100.	127.30	247.00	-72.05	0.1227E+03	0.2125E+03	-9999.00
50200.	126.64	248.00	-72.01	0.1220E+03	0.2114E+03	-9999.00
50300.	129.27	245.00	-71.97	0.1214E+03	0.2102E+03	-9999.00
50400.	129.27	247.00	-71.93	0.1208E+03	0.2091E+03	-9999.00
50500.	127.62	246.00	-71.89	0.1202E+03	0.2080E+03	-9999.00
50600.	127.30	247.00	-71.85	0.1195E+03	0.2069E+03	-9999.00
50700.	133.53	243.00	-71.81	0.1189E+03	0.2058E+03	-9999.00
50800.	125.00	249.00	-71.77	0.1183E+03	0.2047E+03	-9999.00
50900.	125.00	250.00	-71.73	0.1177E+03	0.2036E+03	-9999.00
51000.	124.67	248.00	-71.69	0.1171E+03	0.2025E+03	-9999.00
51100.	123.03	247.00	-71.20	0.1165E+03	0.2010E+03	-9999.00
51200.	120.08	249.00	-70.71	0.1159E+03	0.1995E+03	-9999.00
51300.	120.08	249.00	-70.22	0.1153E+03	0.1980E+03	-9999.00
51400.	117.78	253.00	-69.73	0.1147E+03	0.1965E+03	-9999.00
51500.	115.81	249.00	-69.24	0.1142E+03	0.1950E+03	-9999.00
51600.	115.16	249.00	-68.75	0.1136E+03	0.1936E+03	-9999.00
51700.	115.16	250.00	-68.26	0.1130E+03	0.1921E+03	-9999.00
51800.	116.14	255.00	-67.77	0.1124E+03	0.1907E+03	-9999.00
51900.	118.44	254.00	-67.28	0.1119E+03	0.1893E+03	-9999.00
52000.	115.49	257.00	-66.79	0.1113E+03	0.1879E+03	-9999.00
52100.	116.80	258.00	-66.95	0.1107E+03	0.1871E+03	-9999.00
52200.	115.16	262.00	-67.11	0.1102E+03	0.1863E+03	-9999.00
52300.	107.61	264.00	-67.27	0.1097E+03	0.1855E+03	-9999.00
52400.	104.99	263.00	-67.43	0.1091E+03	0.1848E+03	-9999.00
52500.	99.41	264.00	-67.59	0.1086E+03	0.1840E+03	-9999.00
52600.	91.86	261.00	-67.75	0.1080E+03	0.1832E+03	-9999.00
52700.	89.89	259.00	-67.91	0.1075E+03	0.1825E+03	-9999.00
52800.	81.04	258.00	-68.07	0.1070E+03	0.1817E+03	-9999.00
52900.	82.02	255.00	-68.23	0.1064E+03	0.1809E+03	-9999.00
53000.	81.69	248.00	-68.39	0.1059E+03	0.1802E+03	-9999.00
53100.	81.69	251.00	-68.52	0.1054E+03	0.1794E+03	-9999.00
53200.	80.38	246.00	-68.65	0.1048E+03	0.1786E+03	-9999.00
53300.	76.77	246.00	-68.78	0.1043E+03	0.1778E+03	-9999.00
53400.	84.97	236.00	-68.91	0.1037E+03	0.1770E+03	-9999.00
53500.	82.02	232.00	-69.04	0.1032E+03	0.1762E+03	-9999.00
53600.	77.76	234.00	-69.17	0.1027E+03	0.1754E+03	-9999.00
53700.	81.36	230.00	-69.30	0.1022E+03	0.1746E+03	-9999.00
53800.	83.66	229.00	-69.43	0.1016E+03	0.1738E+03	-9999.00
53900.	83.33	233.00	-69.56	0.1011E+03	0.1730E+03	-9999.00
54000.	89.24	231.00	-69.69	0.1006E+03	0.1722E+03	-9999.00
55000.	85.30	250.00	-71.79	0.9564E+02	0.1655E+03	-9999.00
56000.	78.08	260.00	-72.19	0.9084E+02	0.1575E+03	-9999.00
57000.	61.35	267.00	-70.69	0.8630E+02	0.1485E+03	-9999.00
58000.	43.31	264.00	-68.59	0.8203E+02	0.1397E+03	-9999.00
59000.	30.84	249.00	-69.49	0.7798E+02	0.1334E+03	-9999.00
60000.	28.22	247.00	-69.59	0.7412E+02	0.1268E+03	-9999.00
61000.	24.28	247.00	-68.79	0.7045E+02	0.1201E+03	-9999.00
62000.	21.98	244.00	-67.89	0.6699E+02	0.1137E+03	-9999.00
63000.	17.72	232.00	-65.09	0.6372E+02	0.1067E+03	-9999.00



TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
64000.	10.17	204.00	-60.89	0.6066E+02	0.9956E+02	-9999.00
65000.	8.20	178.00	-62.19	0.5777E+02	0.9540E+02	-9999.00
66000.	6.23	174.00	-60.49	0.5502E+02	0.9013E+02	-9999.00
67000.	6.56	162.00	-59.09	0.5242E+02	0.8531E+02	-9999.00
68000.	2.62	163.00	-57.99	0.4996E+02	0.8089E+02	-9999.00
69000.	6.89	324.00	-58.19	0.4762E+02	0.7717E+02	-9999.00
70000.	11.48	344.00	-58.09	0.4539E+02	0.7353E+02	-9999.00
71000.	13.12	12.00	-56.99	0.4327E+02	0.6973E+02	-9999.00
72000.	15.75	33.00	-56.59	0.4125E+02	0.6636E+02	-9999.00
73000.	14.76	51.00	-56.59	0.3933E+02	0.6327E+02	-9999.00
74000.	14.44	84.00	-55.09	0.3751E+02	0.5993E+02	-9999.00
75000.	15.42	113.00	-54.39	0.3578E+02	0.5698E+02	-9999.00
76000.	13.45	127.00	-53.39	0.3413E+02	0.5410E+02	-9999.00
77000.	5.58	143.00	-52.59	0.3257E+02	0.5144E+02	-9999.00
78000.	5.25	310.00	-51.49	0.3109E+02	0.4886E+02	-9999.00
79000.	14.11	325.00	-51.59	0.2967E+02	0.4665E+02	-9999.00
80000.	16.73	335.00	-51.89	0.2832E+02	0.4459E+02	-9999.00
81000.	16.40	350.00	-52.09	0.2703E+02	0.4260E+02	-9999.00
82000.	18.04	5.00	-50.19	0.2580E+02	0.4031E+02	-9999.00
83000.	19.03	12.00	-50.09	0.2464E+02	0.3848E+02	-9999.00
84000.	17.06	18.00	-49.39	0.2353E+02	0.3663E+02	-9999.00
85000.	16.40	26.00	-48.69	0.2247E+02	0.3487E+02	-9999.00
86000.	14.44	30.00	-48.79	0.2146E+02	0.3332E+02	-9999.00
87000.	11.81	34.00	-47.39	0.2050E+02	0.3163E+02	-9999.00
88000.	9.84	44.00	-46.69	0.1959E+02	0.3014E+02	-9999.00
89000.	8.86	41.00	-45.59	0.1872E+02	0.2866E+02	-9999.00
90000.	9.84	14.00	-46.39	0.1789E+02	0.2748E+02	-9999.00
91000.	13.45	353.00	-44.99	0.1710E+02	0.2611E+02	-9999.00
92000.	11.15	359.00	-44.59	0.1634E+02	0.2491E+02	-9999.00
93000.	5.91	14.00	-42.19	0.1563E+02	0.2358E+02	-9999.00
94000.	2.30	347.00	-41.89	0.1494E+02	0.2251E+02	-9999.00
97000.	2.46	52.75	-39.07	0.1252E+02	0.1863E+02	-9999.00
100000.	4.50	80.52	-36.25	0.1049E+02	0.1542E+02	-9999.00
103000.	6.92	90.07	-33.42	0.8788E+01	0.1277E+02	-9999.00
106000.	9.43	94.62	-30.60	0.7364E+01	0.1058E+02	-9999.00
109000.	11.97	97.24	-27.78	0.6170E+01	0.8760E+01	-9999.00
112000.	11.07	96.64	-25.39	0.5450E+01	0.7663E+01	-9999.00
115000.	10.48	95.39	-22.88	0.4830E+01	0.6723E+01	-9999.00
118000.	9.90	94.18	-20.37	0.4280E+01	0.5898E+01	-9999.00
121000.	9.33	92.62	-17.85	0.3790E+01	0.5172E+01	-9999.00
124000.	8.76	90.86	-15.34	0.3350E+01	0.4527E+01	-9999.00
127000.	8.20	88.85	-12.82	0.2970E+01	0.3974E+01	-9999.00
130000.	9.87	96.30	-10.72	0.2660E+01	0.3531E+01	-9999.00
133000.	11.61	101.41	-8.62	0.2370E+01	0.3121E+01	-9999.00
136000.	13.43	105.16	-6.52	0.2120E+01	0.2770E+01	-9999.00
139000.	15.32	108.09	-4.42	0.1890E+01	0.2450E+01	-9999.00
142000.	17.21	110.30	-2.32	0.1690E+01	0.2174E+01	-9999.00
145000.	19.78	112.52	-0.85	0.1510E+01	0.1932E+01	-9999.00
148000.	23.21	114.65	-0.17	0.1360E+01	0.1736E+01	-9999.00
151000.	26.66	116.22	0.51	0.1220E+01	0.1553E+01	-9999.00

TABLE 5. (Continued)

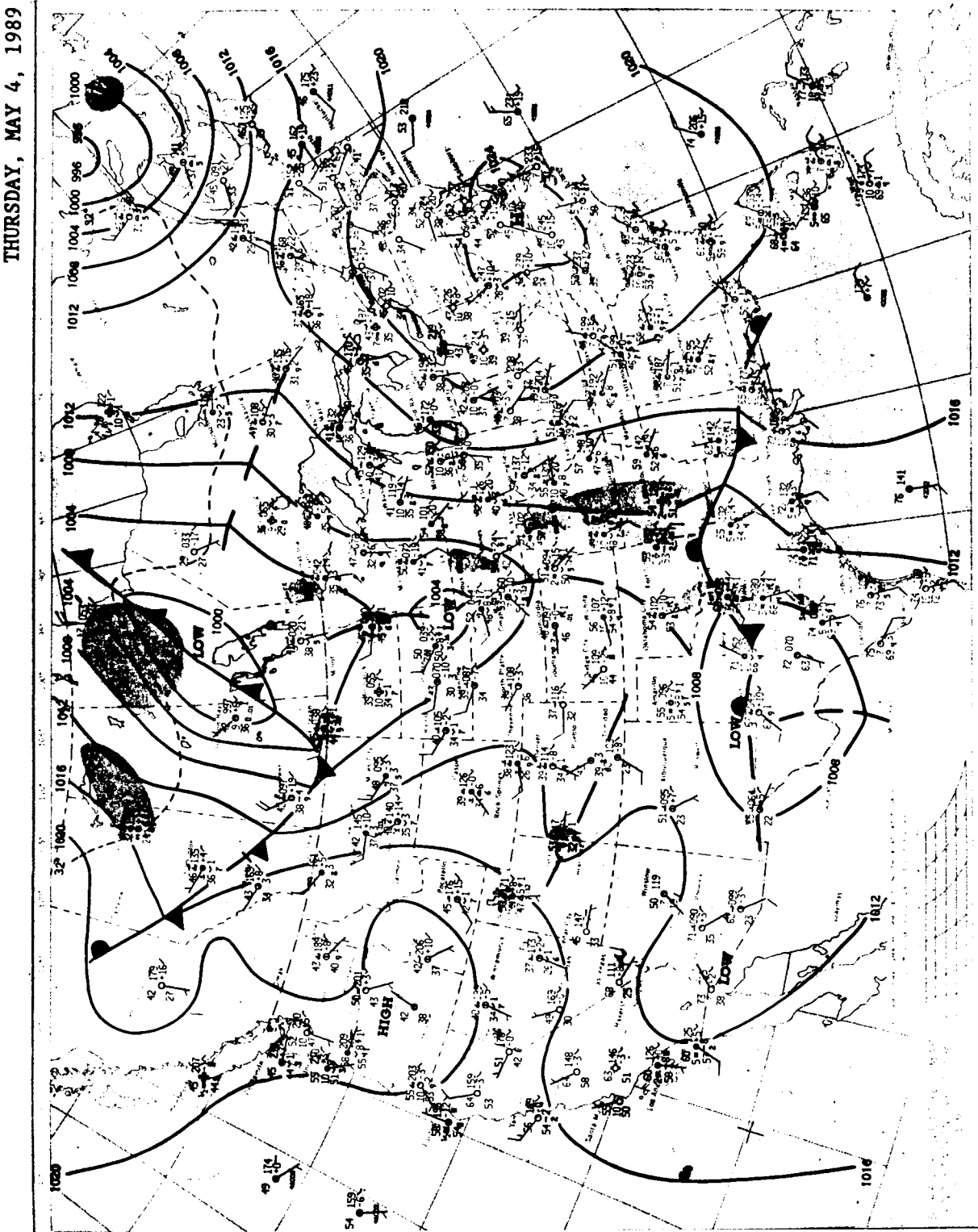
ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MTLLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
154000.	30.13	117.43	1.19	0.1090E+01	0.1384E+01	-9999.00
157000.	33.60	118.39	1.87	0.9780E+00	0.1239E+01	-9999.00
160000.	37.09	119.17	2.55	0.8760E+00	0.1107E+01	-9999.00
163000.	39.96	117.95	0.98	0.7850E+00	0.9976E+00	-9999.00
166000.	42.78	116.60	-0.86	0.7030E+00	0.8994E+00	-9999.00
169000.	45.64	115.46	-2.70	0.6290E+00	0.8102E+00	-9999.00
172000.	48.51	114.45	-4.54	0.5630E+00	0.7302E+00	-9999.00
175000.	51.38	113.52	-6.38	0.5040E+00	0.6582E+00	-9999.00
178000.	53.63	112.78	-8.40	0.4500E+00	0.5921E+00	-9999.00
181000.	54.61	112.20	-10.80	0.4000E+00	0.5312E+00	-9999.00
184000.	55.59	111.64	-13.21	0.3560E+00	0.4771E+00	-9999.00
187000.	56.58	111.10	-15.61	0.3170E+00	0.4288E+00	-9999.00
190000.	57.58	110.58	-18.01	0.2820E+00	0.3850E+00	-9999.00
193000.	58.61	110.07	-20.41	0.2510E+00	0.3460E+00	-9999.00
196000.	61.07	109.00	-23.02	0.2220E+00	0.3092E+00	-9999.00
199000.	63.98	107.86	-25.69	0.1970E+00	0.2773E+00	-9999.00
202000.	66.93	106.81	-28.37	0.1740E+00	0.2476E+00	-9999.00
205000.	69.88	105.86	-31.04	0.1540E+00	0.2216E+00	-9999.00
208000.	72.85	104.98	-33.71	0.1360E+00	0.1979E+00	-9999.00
211000.	74.15	103.67	-36.47	0.1200E+00	0.1766E+00	-9999.00
214000.	69.59	100.46	-39.54	0.1050E+00	0.1566E+00	-9999.00
217000.	65.33	96.84	-42.60	0.9230E-01	0.1395E+00	-9999.00
220000.	61.32	92.70	-45.67	0.8090E-01	0.1239E+00	-9999.00
223000.	57.68	88.01	-48.71	0.7100E-01	0.1102E+00	-9999.00
226000.	54.51	82.74	-51.74	0.6220E-01	0.9787E-01	-9999.00
229000.	53.84	78.29	-54.63	0.5420E-01	0.8641E-01	-9999.00
232000.	54.51	74.61	-57.43	0.4710E-01	0.7606E-01	-9999.00
235000.	55.42	71.00	-60.24	0.4090E-01	0.6692E-01	-9999.00
238000.	56.50	67.50	-63.05	0.3550E-01	0.5886E-01	-9999.00
241000.	57.81	64.16	-65.86	0.3090E-01	0.5193E-01	-9999.00
244000.	58.31	60.77	-68.54	0.2680E-01	0.4563E-01	-9999.00
247000.	51.29	54.76	-70.19	0.2300E-01	0.3948E-01	-9999.00
250000.	45.01	47.04	-71.92	0.1980E-01	0.3428E-01	-9999.00
253000.	39.82	37.03	-73.66	0.1700E-01	0.2969E-01	-9999.00
256000.	36.16	24.50	-75.39	0.1460E-01	0.2572E-01	-9999.00
259000.	34.52	10.07	-77.13	0.1260E-01	0.2239E-01	-9999.00
262000.	31.44	4.01	-78.36	0.1080E-01	0.1932E-01	-9999.00
265000.	25.88	5.53	-79.19	0.9250E-02	0.1661E-01	-9999.00
268000.	20.30	7.89	-80.02	0.7930E-02	0.1430E-01	-9999.00
271000.	14.82	11.88	-80.85	0.6790E-02	0.1230E-01	-9999.00
274000.	9.50	20.63	-81.68	0.5820E-02	0.1059E-01	-9999.00
277000.	4.88	48.27	-82.51	0.4990E-02	0.9119E-02	-9999.00
280000.	5.80	256.59	-83.27	0.4250E-02	0.7797E-02	-9999.00
283000.	16.08	248.20	-84.03	0.3630E-02	0.6687E-02	-9999.00
286000.	26.42	246.43	-84.79	0.3090E-02	0.5715E-02	-9999.00
289000.	36.75	245.59	-85.55	0.2640E-02	0.4902E-02	-9999.00
292000.	47.11	245.17	-86.30	0.2250E-02	0.4195E-02	-9999.00
295000.	59.92	249.89	-86.69	0.1920E-02	0.3587E-02	-9999.00
298000.	79.48	257.92	-86.61	0.1630E-02	0.3044E-02	-9999.00
301000.	103.11	262.93	-86.53	0.1390E-02	0.2595E-02	-9999.00

TABLE 5. (Concluded)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
304000.	129.20	266.11	-86.44	0.1180E-02	0.2202E-02	-9999.00
307000.	155.62	268.24	-86.36	0.1000E-02	0.1865E-02	-9999.00
310000.	179.43	269.74	-86.28	0.8530E-03	0.1590E-02	-9999.00
313000.	188.09	269.88	-84.77	0.7260E-03	0.1343E-02	-9999.00
316000.	191.73	269.88	-83.08	0.6190E-03	0.1135E-02	-9999.00
319000.	190.09	269.88	-81.38	0.5270E-03	0.9573E-03	-9999.00
322000.	181.00	269.88	-79.69	0.4490E-03	0.8085E-03	-9999.00
325000.	161.75	269.87	-78.00	0.3820E-03	0.6819E-03	-9999.00
328000.	143.31	269.87	-75.39	0.3270E-03	0.5760E-03	-9999.00
331000.	146.82	269.86	-70.96	0.2830E-03	0.4876E-03	-9999.00
334000.	146.69	269.85	-66.53	0.2440E-03	0.4114E-03	-9999.00
337000.	141.40	269.83	-62.10	0.2110E-03	0.3483E-03	-9999.00
340000.	129.07	269.81	-57.67	0.1820E-03	0.2942E-03	-9999.00
343000.	107.22	269.75	-53.24	0.1570E-03	0.2487E-03	-9999.00
346000.	102.36	269.72	-46.28	0.1380E-03	0.2119E-03	-9999.00
349000.	102.49	269.69	-38.58	0.1230E-03	0.1827E-03	-9999.00
352000.	99.67	269.62	-30.89	0.1090E-03	0.1567E-03	-9999.00
355000.	92.92	269.51	-23.20	0.9600E-04	0.1338E-03	-9999.00
358000.	81.01	269.37	-15.50	0.8470E-04	0.1145E-03	-9999.00
361000.	67.36	269.16	-7.18	0.7530E-04	0.9863E-04	-9999.00
364000.	67.73	269.03	3.33	0.6860E-04	0.8644E-04	-9999.00
367000.	66.75	268.87	13.83	0.6230E-04	0.7563E-04	-9999.00
370000.	64.09	268.62	24.34	0.5660E-04	0.6628E-04	-9999.00
373000.	59.25	268.29	34.85	0.5130E-04	0.5802E-04	-9999.00
376000.	51.68	267.74	45.36	0.4650E-04	0.5086E-04	-9999.00
379000.	47.88	267.41	56.62	0.4250E-04	0.4490E-04	-9999.00
382000.	47.24	267.09	68.56	0.3920E-04	0.3996E-04	-9999.00
385000.	46.67	266.69	80.84	0.3620E-04	0.3563E-04	-9999.00
388000.	46.12	266.33	93.43	0.3360E-04	0.3193E-04	-9999.00
391000.	45.62	265.92	106.31	0.3120E-04	0.2864E-04	-9999.00
394000.	45.15	265.50	119.44	0.2910E-04	0.2582E-04	-9999.00
397000.	44.69	265.03	132.79	0.2720E-04	0.2334E-04	-9999.00
400000.	44.20	264.55	146.33	0.2550E-04	0.2118E-04	-9999.00

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OF POOR QUALITY

THURSDAY, MAY 4, 1989



Surface Synoptic Map at 1200 u.t. May 4, 1989 — Isobaric, Frontal, and Precipitation Patterns Are Shown in Standard Symbolic Form.

Figure 1. Surface synoptic chart 6 hr 47 min before launch of STS-30.

500-MILLIBAR HEIGHT CONTOURS  
AT 7:00 A.M. E.S.T.

Dashed Lines Are Isotherms in Degrees Centigrade. Arrows Show Wind Direction and Speed at the 500-mb Level.

24

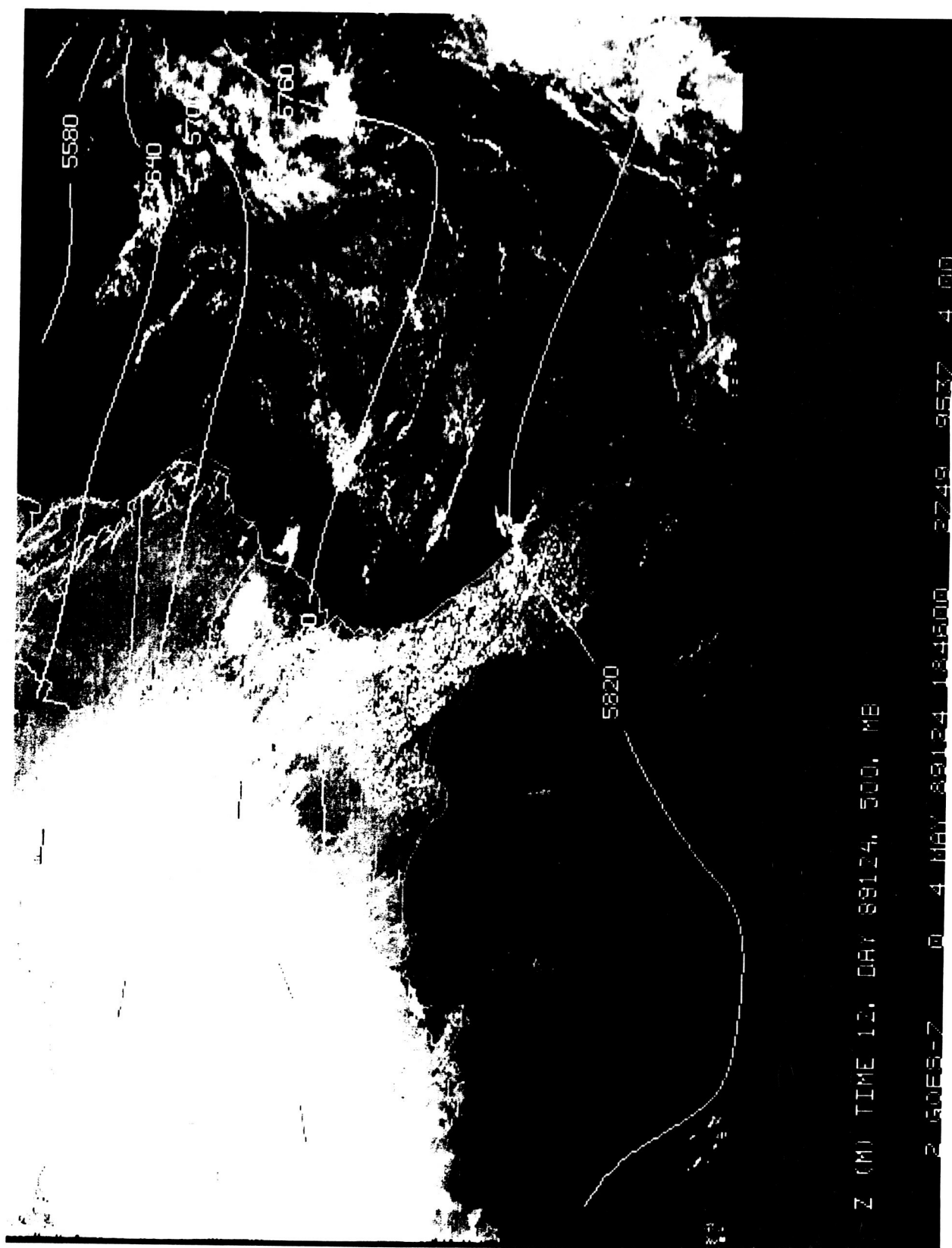


Figure 3. GOES-7 visible imagery of cloud cover 1 min before launch of STS-30 (1846 u.t., May 4, 1989). 500-mb heights (meters) and wind barbs are also included for 1200 u.t.

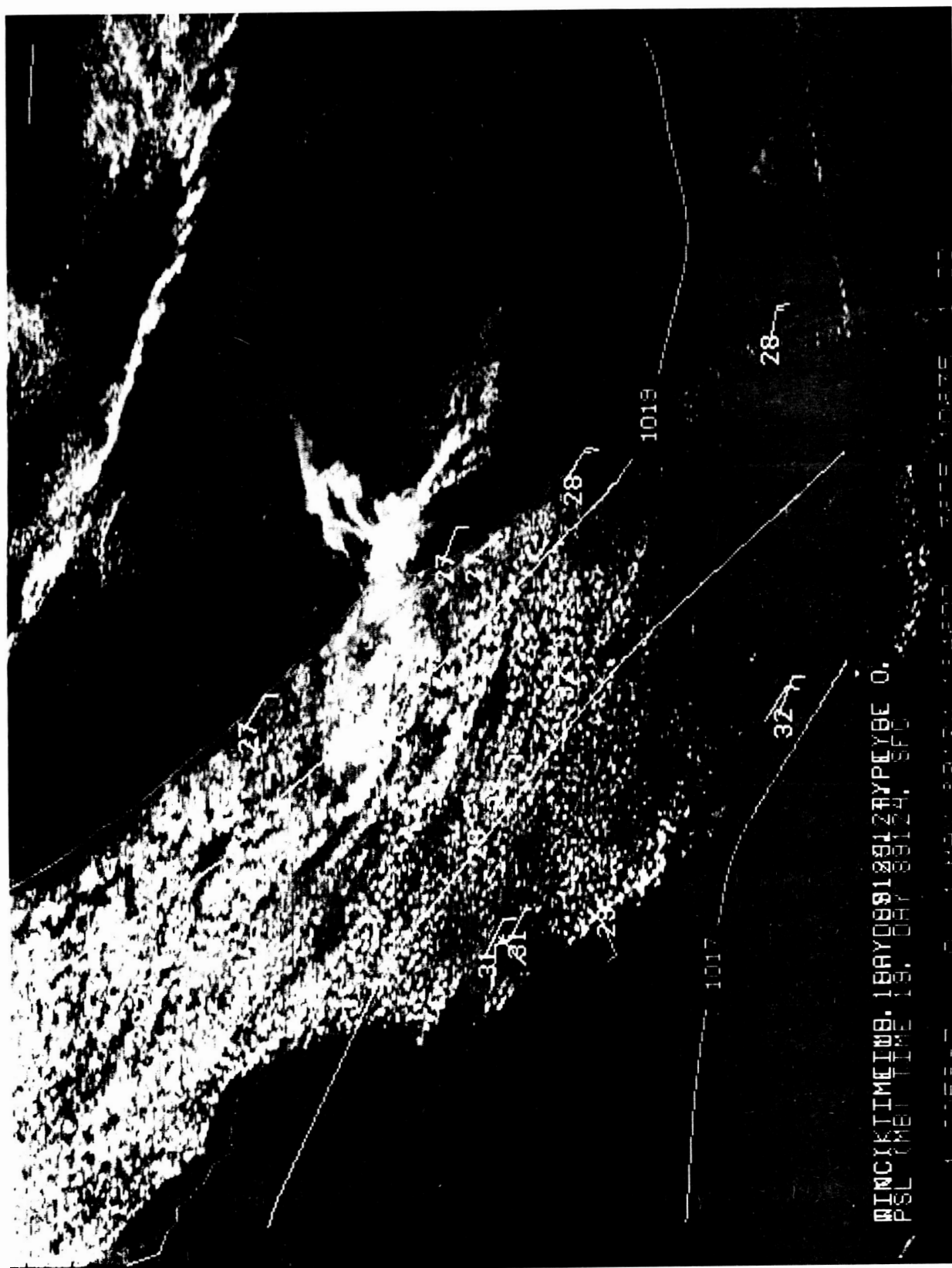


Figure 4. Enlarged view of GOES-7 visible imagery of cloud cover taken 1 min before launch of STS-30 (1846 u.t., May 4, 1989). Surface temperatures, isobaric parameters, and wind barbs for 1900 u.t. are also included.

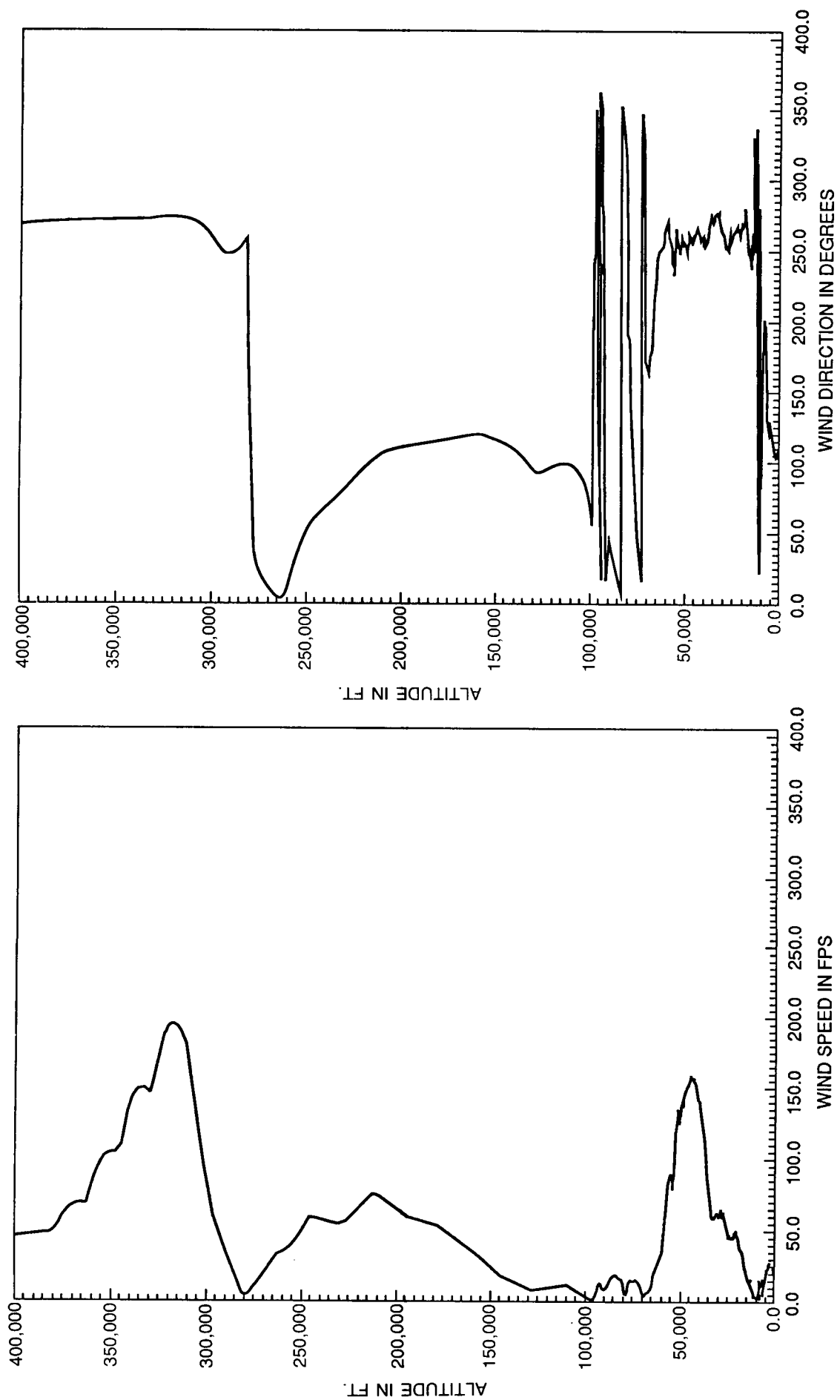


Figure 5. Scalar wind speed and direction at launch time of STS-30.



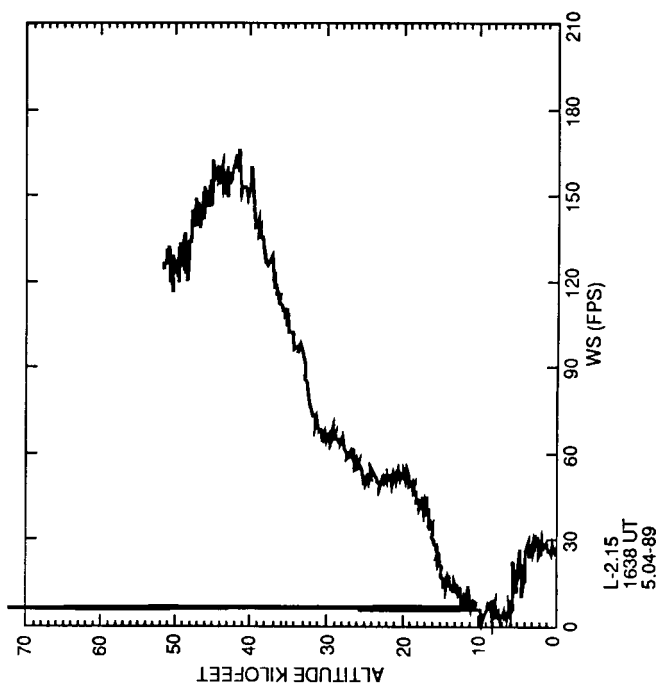
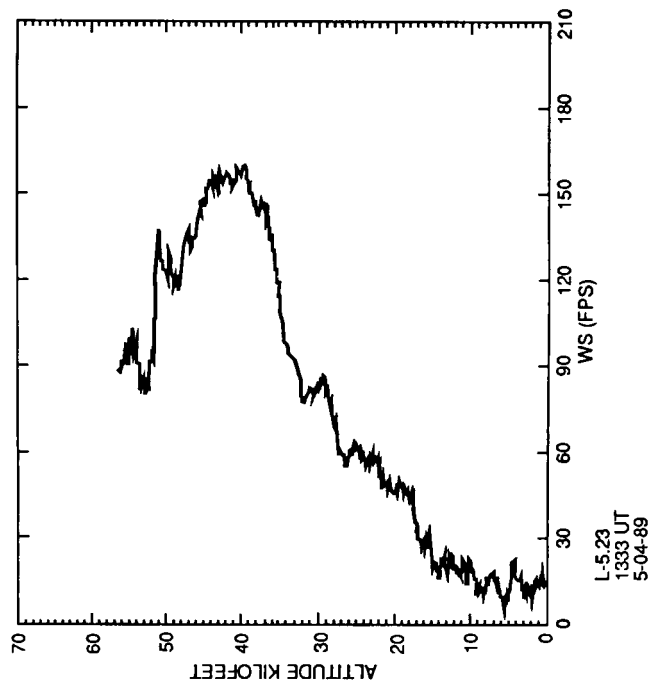
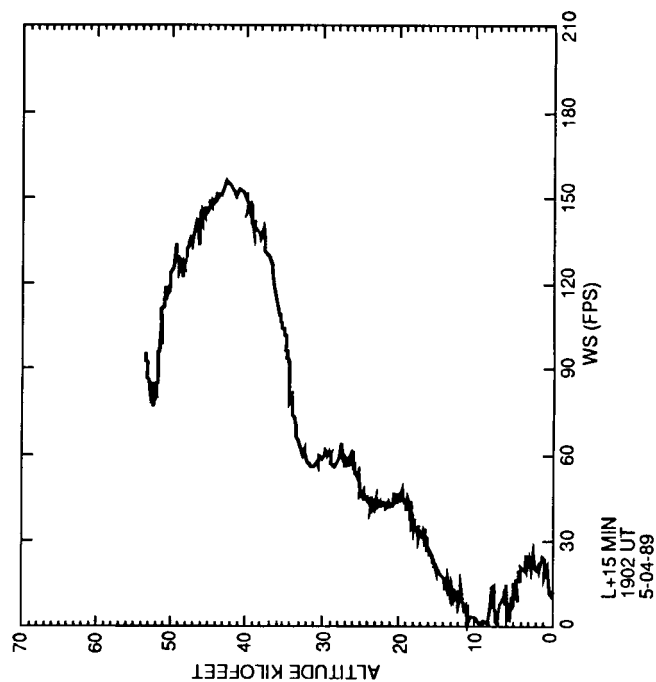
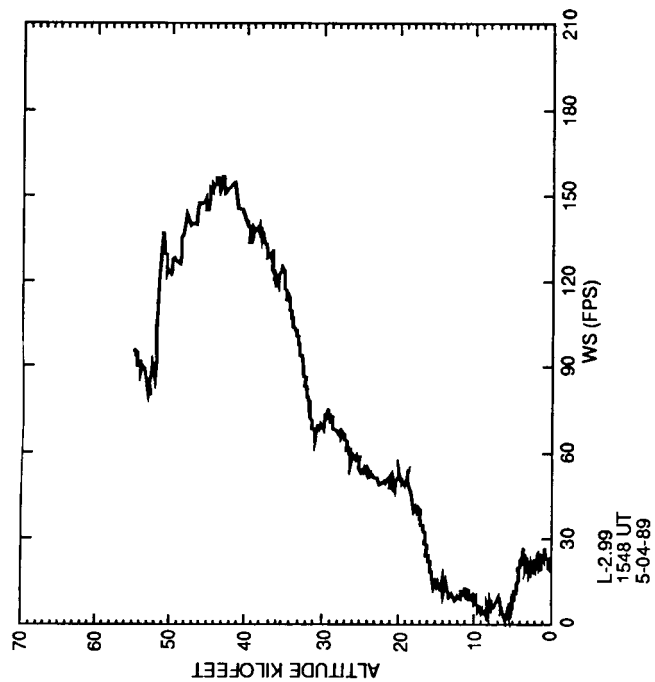


Figure 6. STS-30 prelaunch/launch Jimsphere-measured wind speeds (FPS).

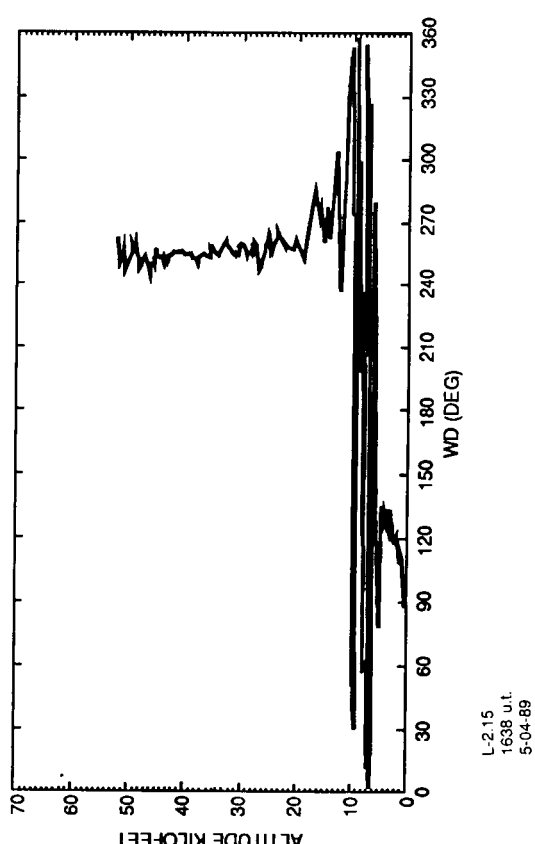
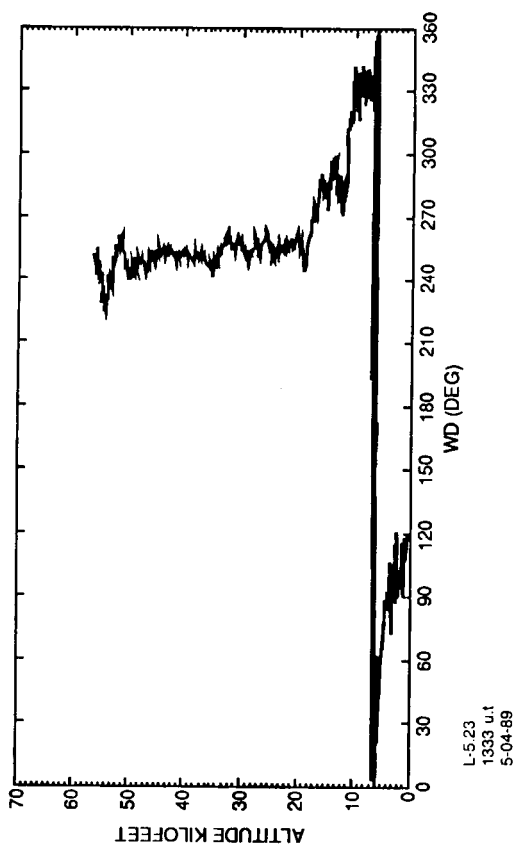
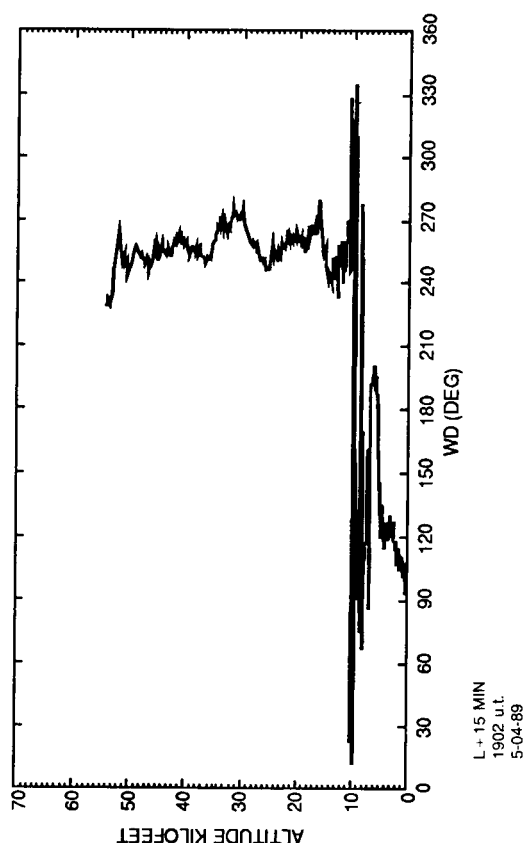
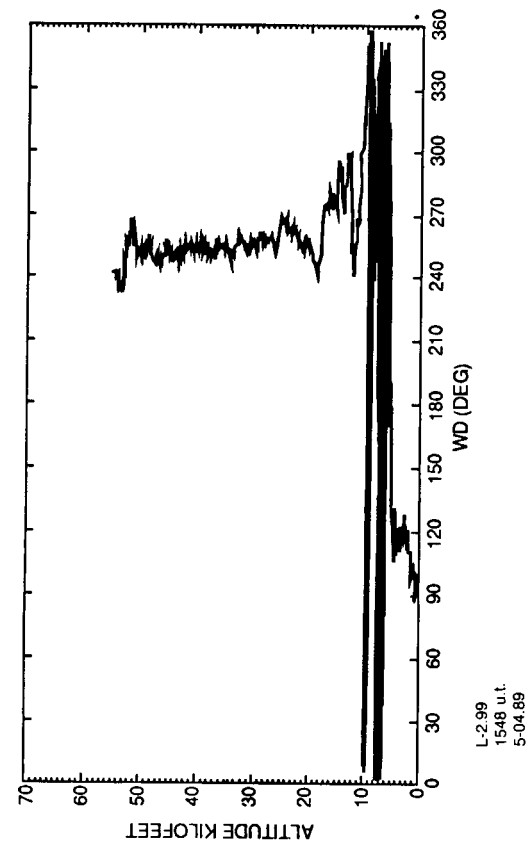


Figure 7. STS-30 prelaunch/launch Jimsphere-measured wind directions (degrees).

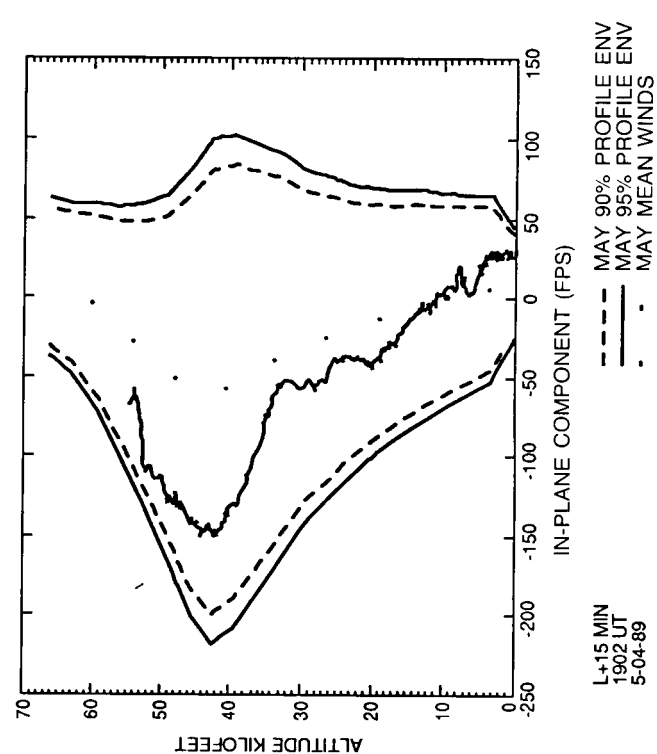
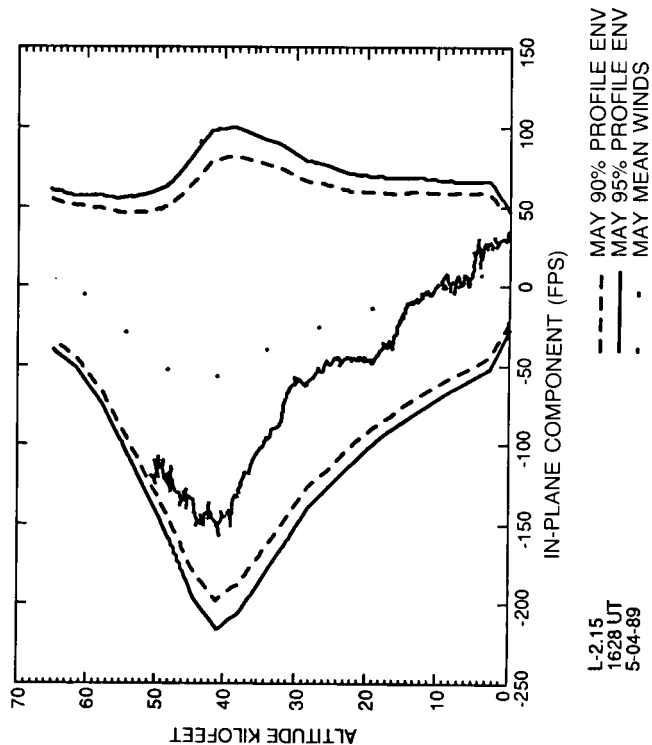
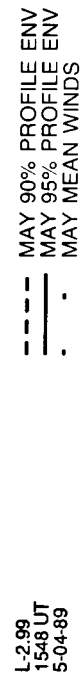
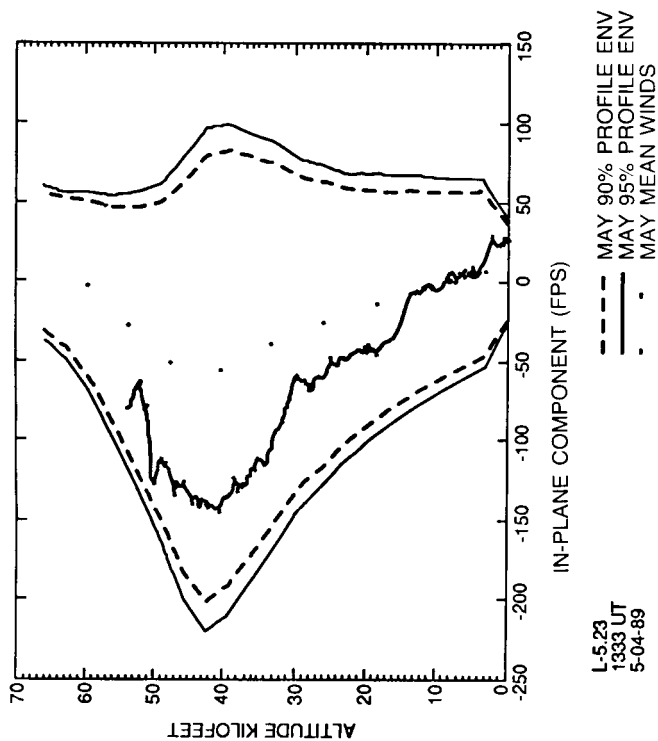


Figure 8. STS-30 prelaunch/launch Jimsphere-measured in-plane component winds (FPS).  
 Flight azimuth = 88 deg.

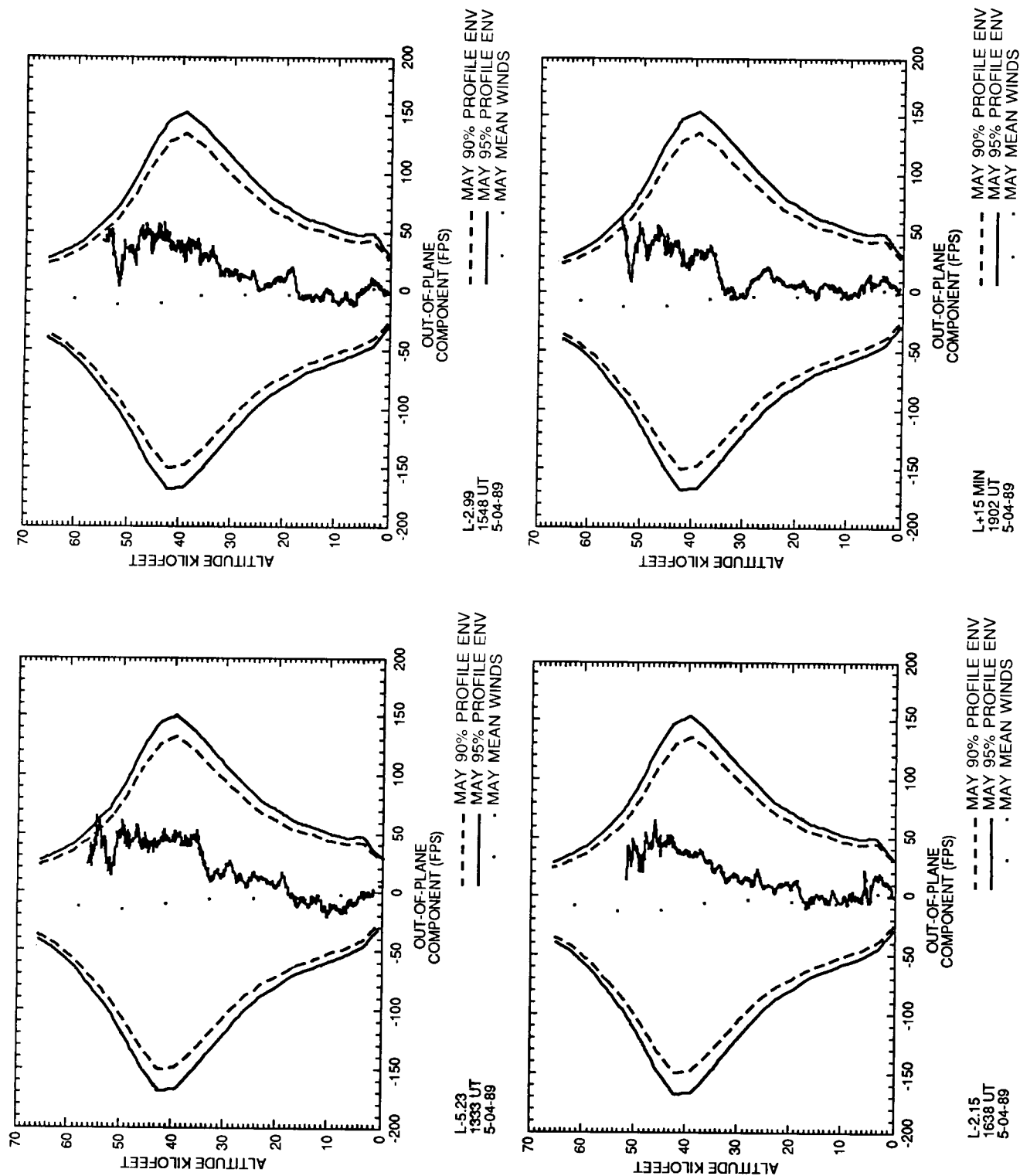


Figure 9. STS-30 prelaunch/launch Jimsphere-measured out-of-plane component winds (FPS).  
Flight azimuth = 88 deg.

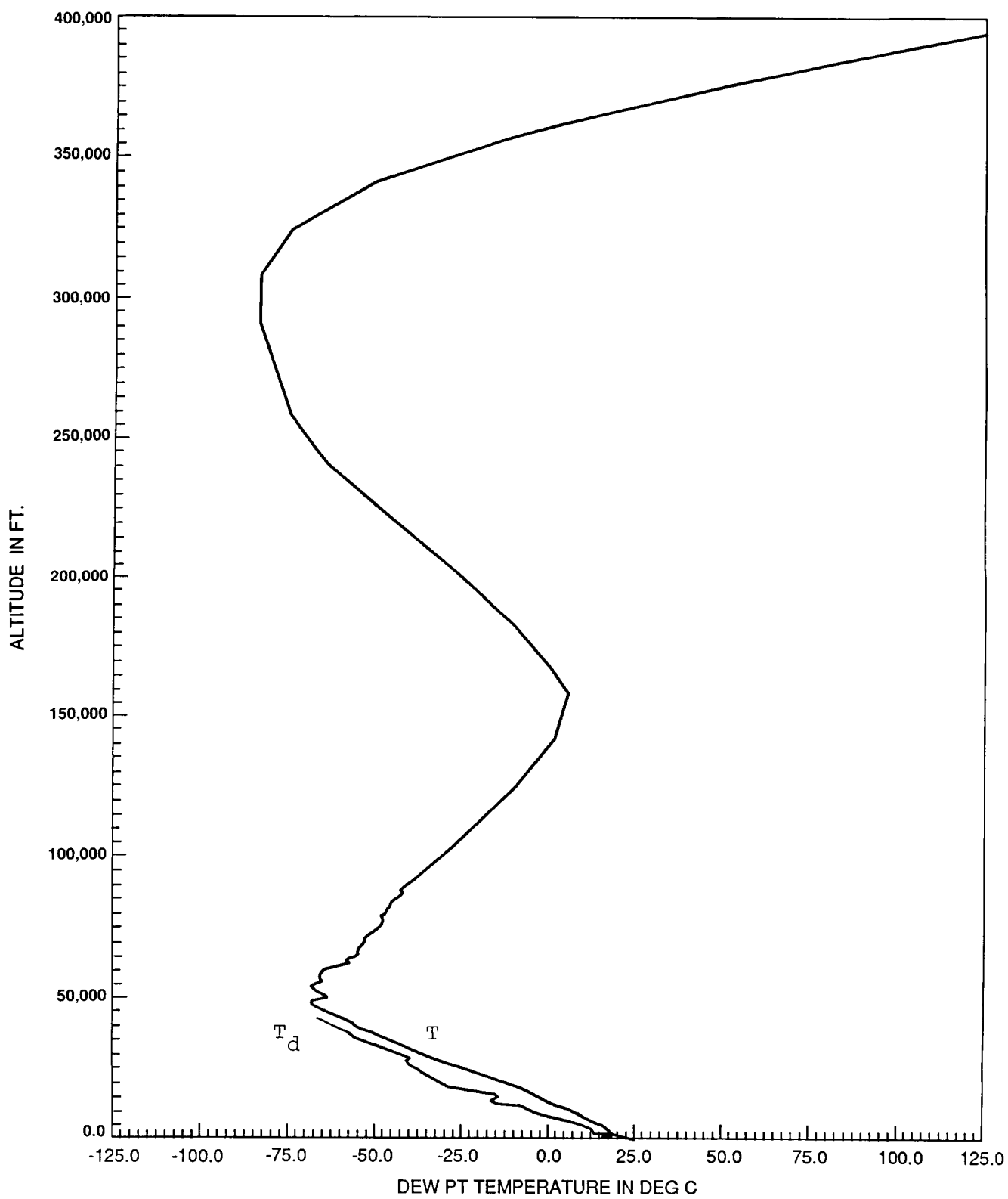


Figure 10. STS-30 temperature profiles versus altitude for launch (ascent).

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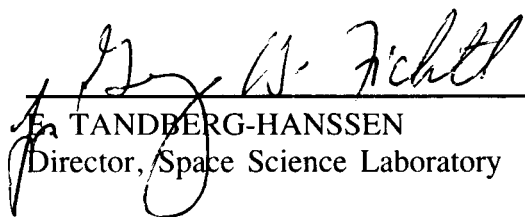
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## APPROVAL

### ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-30) LAUNCH

By G.L. Jasper and G.W. Batts

The information in this report has been reviewed for technical content. Review of any information concerning Department of Defense or nuclear energy activities or programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.



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TANDBERG-HANSEN  
Director, Space Science Laboratory



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16. ABSTRACT  This report presents a summary of selected atmospheric conditions observed near Space Shuttle STS-30 launch time on May 4, 1989, at Kennedy Space Center, Florida. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of pre-launch Jimsphere-measured vertical wind profiles is given in this report. The final atmospheric tape, which consists of wind and thermodynamic parameters versus altitude, for STS-30 vehicle ascent has been constructed. The STS-30 ascent atmospheric data tape has been constructed by Marshall Space Flight Center's Earth Science and Applications Division to provide an internally consistent data set for use in post-flight performance assessments.					
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